DRDC Toronto No. CR 2004-077

CREATING A MEASURE OF TRUST IN SMALL MILITARY TEAMS

by:

Barbara D Adams, Lora E. Bruyn, Greg Chung-Yan

Human*systems*® Incorporated
111 Farquhar St., 2nd floor
Guelph, ON N1H 3N4

Project Manager:
Barbara D. Adams, Ph.D.
(519) 836 5911

PWGSC Contract No. W7711-017747/001/TOR
Call-Up 7747-03

On behalf of
DEPARTMENT OF NATIONAL DEFENCE

as represented by
Defence Research and Development Canada - Toronto
1133 Sheppard Avenue West
Toronto, Ontario, Canada
M3M 3B9

DRDC Scientific Authority
Carol McCann
(416) 635-2190

April 2004

The scientific or technical validity of this Contract Report is entirely the responsibility of the contractor and the contents do not necessarily have the approval or endorsement of Defence R&D Canada.

105-05752/

© HER MAJESTY THE QUEEN IN RIGHT OF CANADA (2004)
as represented by the Minister of National Defense

© SA MAJESTE LA REINE EN DROIT DUE CANADA (2004)
Defense Nationale Canada

Abstract

This report describes the creation of scales to measure trust in teams and trust in a team leader in the context of small military teams. This work is divided into four sections. The first section includes a review of existing literature on the measurement of trust in others, trust in a leader and trust in teams. From this, implications for future measures of trust in teams are outlined. The second section recounts the process of creating the trust in teams and trust in leader scales, including conceptual decisions that were made during the process of scale development. The third section describes the design and findings of a study conducted to explore the psychometric properties of the first iteration of these scales, and offers recommendations for further refinement. The fourth and final section describes a pilot study exploring the use of implicit measures of trust in teams and makes recommendations for future work.

Résumé

Le rapport décrit la création d'échelles visant à mesurer la confiance envers l'équipe et le chef d'équipe dans le contexte de petites équipes militaires. Le document est divisé en quatre sections. La première comprend un examen de la documentation publiée sur la mesure de la confiance envers les autres, de la confiance envers le chef et de la confiance envers l'équipe. En se fondant sur cet examen, on décrit les répercussions sur des mesures ultérieures de la confiance envers l'équipe. La deuxième section décrit le processus de création des échelles de confiance envers l'équipe et de confiance envers le chef, y compris les décisions conceptuelles prises pendant le processus d'élaboration des échelles. La troisième section expose la structure et les conclusions d'une étude effectuée en vue d'analyser les propriétés psychométriques de la première itération des échelles et présente des recommandations d'amélioration. La quatrième et dernière section décrit une étude pilote analysant l'utilisation de mesures implicites de la confiance envers l'équipe et l'on y formule des recommandations de travaux futurs.

Executive Summary

This report discusses the development of scales to measure trust in teams and trust in a leader in the context of small military teams. In total, this work has four sections.

The first section includes a review of existing literature on the measurement of generalized trust, trust in specific others, trust in a leader and trust in teams and group. In general, we found that although the emphasis of a given researcher varies and the measurement approaches vary, it is clear that the key underlying features of trust are fairly common across researchers. Trust in specific others has generated the most attention. Unfortunately this work has not always been directly relevant to the issue of trust in small military teams. The literature review revealed a few limitations of research conducted to date. Existing measures, in general, have rarely been subject to validation efforts. Moreover, the subject pools used to test existing measures are also potentially problematic, as trust between members of true teams has rarely been explored. Nonetheless, existing efforts to measure trust do yield a number of important insights into how best to measure trust in teams and trust in a leader. Based on the above findings, implications for future measures of trust in teams are outlined.

The second section of this work first considers the pragmatic and conceptual requirements of the trust in teams and trust in leader scales. At a pragmatic level, these scales need to be relatively easy and quick to administer, and must also have face validity in order to be accepted in the military environment. Conceptual decisions related to the unit of analysis, direct vs. indirect measures of trust and scale generalizability are also described.

The third section describes the process of creating the trust in teams and trust in leader scales, and describes the results of a study exploring the psychometric properties of the scale. In general, results showed that the first iteration of the trust in teams and trust in leader scale worked relatively well, despite the fact that it failed to adequately capture the competence dimension. The factor structure is relatively simple, and the scale items load on the expected factors of benevolence, integrity and predictability. There is also good evidence for the validity of the trust scales from several perspectives. Lastly, we consider limitations of these measures and offer recommendations for scale refinement.

The fourth section describes the results of a pilot study exploring the use of implicit measures to understand trust in small military teams. This study showed that that implicit measures did appear to be useful for capturing trust in teams, and did have face validity, but that the relationship with explicit measures was low. The implications of this pilot study for future work are also considered.

Sommaire

Le présent rapport traite de l'élaboration d'échelles visant à mesurer la confiance envers l'équipe et la confiance envers le chef dans le contexte de petites équipes militaires. En tout, le document comporte quatre sections.

La première section comprend un examen de la documentation publiée sur la mesure de la confiance généralisée, de la confiance envers des tierces parties désignées, de la confiance envers le chef et de la confiance envers l'équipe et le groupe. En général, on a constaté que bien que la priorité accordée varie d'un chercheur à l'autre et que les méthodes de mesure diffèrent, il est évident que les chercheurs reconnaissent à peu près tous les mêmes caractéristiques sous-jacentes clés de la confiance. C'est la confiance envers des tierces parties désignées qui a suscité le plus d'attention. Malheureusement, ces travaux ne se rapportent pas toujours directement à la question de la confiance au sein de petites équipes militaires. L'examen de la documentation a fait ressortir quelques limites des recherches effectuées à ce jour. En général, les mesures existantes ont rarement fait l'objet de démarches de validation. En outre, l'échantillonnage ayant servi à tester les mesures existantes est aussi potentiellement problématique puisque la confiance entre les membres d'équipes réelles a rarement été étudiée. Néanmoins, certaines démarches visant à mesurer la confiance donnent quelques indications importantes sur la meilleure façon de mesurer la confiance envers l'équipe et la confiance envers le chef. Compte tenu des conclusions qui précèdent, on décrit les répercussions sur des mesures ultérieures de la confiance envers l'équipe.

La deuxième section du document traite d'abord des exigences pragmatiques et conceptuelles des échelles de confiance envers l'équipe et de la confiance envers le chef. Sur le plan pragmatique, ces échelles doivent être relativement simples et rapides à appliquer, et elles doivent avoir une validité apparente afin d'être acceptées dans le monde militaire. On décrit également les décisions conceptuelles liées à l'unité d'analyse, les mesures directes de la confiance par rapport aux mesures indirectes, ainsi que la possibilité de généraliser les échelles.

La troisième section décrit le processus de création des échelles de confianceenvers l'équipe et de confiance envers le chef, puis fait état des conclusions d'une étude analysant les propriétés psychométriques de l'échelle. En général, les résultats laissent voir que la première itération de l'échelle de confiance envers l'équipe et de confiance envers le chef a fonctionné assez bien, malgré son incapacité à traiter adéquatement l'aspect de la compétence. La structure factorielle est relativement simple, et les éléments de l'échelle tiennent compte des facteurs attendus comme la bienveillance, l'intégrité et la prévisibilité. On relève aussi de bonnes preuves de la validité des échelles de confiance de plusieurs points de vue. Enfin, on envisage les limites de ces mesures et l'on offre des recommandations en vue de l'amélioration des échelles.

La quatrième section décrit les conclusions d'une étude pilote portant sur l'utilisation de mesures implicites afin de comprendre la confiance au sein de petites équipes militaires. L'étude a montré que des mesures implicites semblent effectivement être utiles pour cerner la confiance envers l'équipe et qu'elles présentent une validité apparente, mais que le lien avec les mesures explicites est ténu. On se penche également sur les répercussions de cette étude pilote sur des travaux ultérieurs.

Table of Contents

ABSTRACT I

RÉSUMÉ II

EXECUTIVE SUMMARY III

SOMMAIRE IV

TABLE OF CONTENTS V

LIST OF TABLES VII

1. MEASURING TRUST 1

1.1 Measuring Generalized Trust in Others 2
1.2 Measuring Trust in Specific Persons 3
1.3 Measuring Trust in Leaders 9
1.4 Measuring Trust in Teams and Groups 13
1.5 Implications for Future Measures of Trust in Teams 16

2 CONSIDERATIONS FOR MEASURES OF TRUST 19

2.1 Pragmatic Requirements and Conceptual Decisions 19
2.1.1 Unit of Analysis as Team or Individual 20
2.1.2 Trust as a Component Judgement 21
2.1.3 Maintaining Scale Generalizability 22

3. CREATING AND ANALYZING THE TRUST SCALES 24

3.1 Creating Scale Items 24
3.2 Method 26
3.2.1 Participants 26
3.2.2 Questionnaires Administered 26
3.3 Results 27
3.3.1 Experience and Team History 27
3.3.2 Trust in Teams Scale 27
3.3.3 Trust in Leader Scale 29
3.3.4 Single Item Measures of Trust in Team and Leader 31
3.3.5 Importance of Trust Ratings 31
3.3.6 Propensity to Trust 32
3.3.7 Feedback about Trust Measures 32
3.4 Preliminary Validation of the Trust Scales 34
3.4.1 Single Item Measure of Trust vs. Scale Measure of Trust 35
3.4.2 Regression Models 36
3.4.3 Propensity to Trust vs. Trust in General 40
3.5 Discussion 41
3.6 Limitations and Caveats 43
3.7 Revisions to Explicit Measures 45

4. IMPLICIT MEASURES OF TRUST IN TEAMS 48

4.1 RATIONALE FOR USE OF IMPLICIT MEASURES 48
4.2 UNDERSTANDING IMPLICIT MEASURES OF ATTITUDE 49
4.3 PILOT STUDY QUESTIONS 50
4.4 METHOD 51
4.4.1 Participants 51
4.4.2 Procedure and Materials 51
4.4.3 Data Reduction 53
4.5 RESULTS 54
4.5.1 Descriptive Analyses 54
4.5.2 Correlational Analysis 56
4.5.3 Focus Group Feedback 56
4.6 DISCUSSION 56
4.7 LIMITATIONS AND CAVEATS 57
4.8 REVISIONS TO IMPLICIT MEASURES 58

5. REFERENCES 60

ANNEX A: WORD LISTS FOR THE IMPLICIT ASSOCIATION TESTS A-1

List of Tables

Table 1: Trust Subscale Items for Wrightsman's Philosophies of Human Nature 2
Table 2: Sample Items for Rotter's (1967) Interpersonal Trust Scale 3
Table 3: Sample Items for Rempel et al., (1985) Trust Scale 4
Table 4: Sample Items for Couch & Jones (1997) Trust Scales 4
Table 5: Larzelere & Huston (1980) Dyadic Trust Scale Items (DTS) 5
Table 6: Sample Items of the SITS-M (Johnson-George & Swap, 1982) 6
Table 7: Sample Items of the SITS-F (Johnson-George & Swap, 1982) 6
Table 8: Items from Butler's (1991) Conditions of Trust Inventory (CTI) 8
Table 9: Trust in Leader at Work Scale (Podsakoff et al., 1990) 9
Table 10: Items from McAllister's Trust Scale (1995) 10
Table 11: Items from Trust in Leader Scale (Dirks, 2000) 11
Table 12: Trust in Leader Items from Shamir et al. (2000) 12
Table 13: Trust in Leader Items from Murphy and Farley (2000) 12
Table 14: Sample Items From Interpersonal Trust at Work Scale (Cook & Wall, 1980) 13
Table 15: OTI Short Form Items (Cummings & Bromiley, 1996) 15
Table 16: Trust Scale used by Simons & Peterson (2000) 15
Table 17: Questionnaires Administered 27
Table 18: Trust in Team Subscales – Factor Structure, Alphas and Variance Explained 28
Table 19: Correlation Matrix for Team and Leader Scale and Subscales 29
Table 20: Trust in Leader Subscales – Factor Structure, Alphas and Variance Explained 30
Table 21: Descriptives for Single Item Measure of Trust in Team and Leader 31
Table 22: Importance of Trust Ratings 31
Table 23: Propensity to Trust Ratings 32
Table 24: Trust Scale Feedback 32
Table 25: Correlation Matrix – Trust Scales vs. Other Questionnaires 35
Table 26: Coefficient Summary of Trust in Team Regression Analyses 36
Table 27: Model Summary of Trust in Team Regression Analyses 36
Table 28: Coefficient Summary of Trust in Team Regression Analyses 38
Table 29: Model Summary of Trust in Team Regression Analyses 38
Table 30: Coefficient Summary of Trust in Leader Regression Analyses 38
Table 31: Model Summary of Trust in Leader Regression Analyses 39
Table 32: Trial blocks used in the Team Trust IAT Task 53
Table 33: Trials excluded from IAT data analysis 53
Table 34: Descriptive stats for Team Trust IAT scores (all units in ms) 55

1. Measuring Trust

This work represents the first in a series of research activities to create and validate a measure of trust in small teams and a measure of trust in a leader within the context of small military teams. Previous efforts have been directed at developing a model of trust in small military teams, and progressed in several stages. First, a preliminary model of trust in small military teams was developed. Then, several focus groups were conducted with military personnel who serve as members of armoured vehicle reconnaissance crews. These focus groups provided a good informal validation of the trust development model. Several factors hypothesized to impact on trust development in the preliminary model were supported at both a quantitative and qualitative level. The trust development process, as modelled, was also supported. Based on the results of this work and the feedback given by military personnel, the model was refined. The final model of trust development in small teams depicts trust development as a process simultaneously influenced by the interaction of qualities of the trustee, the trustor, and several contextual factors. This model provides the conceptual foundation for the current effort aimed at creating and validating a measure of trust in small teams.

Military scholars have long recognized the importance of building a command climate of trust. Trust within infantry teams is frequently cited as associated with team cohesion, morale and esprit de corps (Cox, 1996; McCann & Pigeau, 1996). Moreover, trust has been posited to be an important contributor not only to positive command climate, but also to the actual performance and achievement of military teams (Cox, 1996; Ivy, 1995).

According to *Land Force Command*, a doctrinal report published by the Department of National Defence (1996), soldiers must not only be able to trust their immediate supervisors, but also those higher up in the chain of command. Likewise, for commanders to function effectively, a superior needs to have earned not only the trust of his subordinates, but also has to place his trust in his subordinates.

Given the importance of trust within military teams, it is surprising that there have been relatively few systematic attempts to measure trust and to validate these measures. There have been even fewer efforts to do so within the military context. The ability to objectively quantify the level of trust within a team is an essential precursor to determining the factors that influence trust within a team, or to understanding the effects of different levels of trust on performance. Knowledge of trust levels within a military team may also be used to contribute to future doctrine and training.

The current work describes the creation of a scale to measure trust in teams and trust in a leader, and includes a literature review, creation of a scale and preliminary testing of the psychometric properties of the first iteration of this scale.

In this section, we consider existing measures of trust in the research literature, in terms of the measurement approaches used, and the validity and reliability of the measures. There have been many different efforts to measure trust, and it is impossible to consider all of them here. Therefore we focus on the most prominent and most influential measures that we have found, based on our experience with and knowledge of the trust literature. This section considers efforts to measure generalized trust, trust in specific others, trust in leaders, and trust within teams or groups, as a background to our development of scales to measure trust in small military teams and in team leaders.

1.1 Measuring Generalized Trust in Others

The work of Wrightsman (1964) represents one of the first attempts to measure the construct of trust at a global level. Wrightsman's Measurement of Philosophies of Human Nature attempts to predict an individual's view of human nature, including trustworthiness, on a global scale. Advancing the work of human nature theorists, Wrightsman developed a scale to measure the six dimensions of human nature: trustworthiness, altruism, independence, strength of will and rationality, and the complexity/variability of human nature. The final scale composed by the author includes 14 statements, for each of the six subscales. The trust items used in this scale are both positive and negative, and are listed in Table 1 below:

Table 1: Trust Subscale Items for Wrightsman's Philosophies of Human Nature

Item
If you give the average person a job to do and leave him or her to do it, the person will finish it successfully.
People usually tell the truth, even when they know they would be better off lying (rev).*
Most students do not cheat when taking an exam.
Most people are basically honest.
If you act in good faith with people, almost all of them will reciprocate with fairness toward you.
Most people lead clean, decent lives.
People claim that they have ethical standards regarding honesty and morality, but few people stick to them when the chips are down (rev).*
If you want people to do a job right, you should explain things to them in great detail and supervise them closely (rev).*
If most people could get into a movie without paying and be sure they were not seen, they would do it (rev).*
Most people are not really honest for a desirable reason; they're afraid of getting caught (rev).*
Most people would tell a lie if they could gain by it (rev).*
Most people would cheat on their income tax, if they had a chance (rev).*
Nowadays people commit a lot of crimes and sins that no one else ever hears about (rev).*

* reverse-scored item

With a sample of 200 undergraduate and graduate students, the researchers explored the reliability and validity of the Measurement of Philosophies of Human Nature. Results showed a positive correlation between trustworthiness and faith in people, and a negative correlation between trustworthiness and political cynicism. Based on these findings, this scale was purported to have acceptable construct validity. Researchers continue to use the trustworthiness subscale as a base for which to create new instruments or as a source of validation for measures of trust toward a specific other (e.g. Costa, Roe, &Thaillcau. 2001; Couch & Jones, 1997), but in light of the general nature of this scale, it seems inappropriate to use it for this purpose.

Rotter (1967) developed perhaps the best known scale for the measurement of interpersonal trust, the Interpersonal Trust Scale (ITS). Rotter (1967) defined interpersonal trust as:

> "an expectancy held by an individual or group that the word, promise, verbal or written statement of another individual or group can be relied on."

The ITS contains 25 trust items in total, each tapping trust in a variety of social objects, including parents, teachers, physicians, politicians, as well as items tapping a more general optimism about society in general. Several sample scale items are listed in Table 2 below:

Table 2: Sample Items for Rotter's (1967) Interpersonal Trust Scale

Item
In dealing with strangers, one is better of to be cautious until they have provided evidence that they are trustworthy (rev).*
Parents usually can be relied upon to keep their promises.
Most elected public officials are really sincere in their campaign promises.
Most people can be counted on to do what they say they will do.

* reverse-scored item

Rotter (1967) has argued that the scale has a low correlation with social desirability, good construct and discriminant validity, and acceptable test-retest validity. However, more recent research has cast doubt on the psychometric properties of the ITS, and the scale's validity is now somewhat suspect. Heretick (1981; cited in Omedei & McLennan, 2000) and Couch, Adams, & Jones (1996), for example, have both argued that the Interpersonal Trust Scale is confounded with locus of control. Other work by Pasewark, Fitzgerald, Sawyer, & Fossey (1973) showed that paranoid schizophrenic people who completed the ITS actually showed higher ratings of generalized trust in others than in the normal population. This finding casts some doubt on the validity of the ITS, as one would expect for paranoid schizophrenics to show less trust in others relative to non-schizophrenics.

Although innovative in their time, however, both the Wrightsman and Rotter measures address only generalized trust, and do not enable predictions about trust in specific other people in specific kinds of situations.[1]

As the trust literature has evolved, the importance of measuring the generalized propensity to trust has decreased somewhat in comparison to measuring a person's trust in specific others. Despite a high level of propensity to trust other people, the extent to which one trusts a specific person will vary, depending on the behaviour of this person, and on the trust-relevant expectations and attributions that one has of this person. For this reason, theorists and researchers have increasingly focused their efforts on measuring trust in specific persons.

1.2 Measuring Trust in Specific Persons

Several scales have been developed to quantify trust in specific persons.

Rempel, Holmes, & Zanna (1985) created a scale to measure individual trust in a specific other in the context of close interpersonal relationships. The Rempel et al. (1985) model hypothesizes that the nature of trust within relationships progresses from predictability to dependability to faith. The scale measures trust using these 3 factors, and consists of 7 items in the predictability subscale, 9

[1] Furthermore, as noted in a previous review (Adams, Bryant and Webb, 2001), this scale has been used inappropriately as a measure of trust in specific others, rather than as a measure of global propensity to trust (Rentsch, McNeese, Pape, Burnett, Menard and Anesgart, 1998).

questions in the dependability subscale and 10 items in the faith subscale. Sample items for each subscale are listed in Table 3.

Table 3: Sample Items for Rempel et al., (1985) Trust Scale

Item	Designated Subscale
When we encounter difficulty and unfamiliar new circumstances I would not feel worried or threatened by letting my partner do what he/she wanted.	Faith
I can count on my partner to be concerned about my welfare.	Dependability
In general, my partner does things in a variety of different ways. He/she almost never sticks to one way of doing things (rev).*	Predictability

* reverse-scored item

This scale was administered to 94 individuals (from 47 exclusive couples). The authors reported high internal consistency of the entire scale and high subscale reliabilities. Moreover, there is some evidence for the validity of the subscales, as trust ratings were correlated in predictable ways with measures of love and motivation within intimate relationships. It is also important to note that this scale was revised in Holmes and Rempel (1989), and consists of 18 items rated from 1 (strongly disagree) to 7 (strongly agree). This more recent scale continues to be used in ongoing work related to trust in close relationships (Rempel, Ross, & Holmes, 2001).

Other research has combined efforts to understand both specific and generalized trust. Work by Couch & Jones (1997), for example, considers trust from three perspectives: Partner Trust (relational trust in specific others), Network Trust (the trust one has in one's social network of family and friends), and Generalized Trust (global trust in others). This work argues that trust in a social network is an important intermediary between trust in specific others and generalized judgements of trust. The Partner Trust scale, Network Trust scale, and Generalized Trust scale are self report scales and contain 20, 20 and 10 items, respectively. Sample items from the Partner and Generalized Trust scales are presented in Table 4.

Table 4: Sample Items for Couch & Jones (1997) Trust Scales

Item	Designated Scale
I tell my partner that I trust him/her completely.	Partner
My partner makes me feel safe.	Partner
My relationships with others are characterized by trust and acceptance.	Generalized
Basically I am a trusting person.	Generalized
Only a fool would trust most people.	Generalized
I tend to be accepting of others.	Generalized
I feel that I can depend on most people I know.	Generalized

Couch & Jones (1997) carried out a study testing the scale using 552 undergraduate university participants, 445 of whom were in a close romantic relationship. Only this latter group, of course, was used in analyses related to partner trust. Participants completed background information sheets, the Trust Inventory, related measures of global and relational trust, and other relevant personality, emotional and relationship constructs, including the Liking and Loving Scale (Rubin, 1970), and the attitudes about love scale (Hendrick & Hendrick, 1986).

Couch & Jones (1997) reported that all 3 scales showed high internal reliability and good test-retest reliability. There was also evidence of concurrent validity of all three subscales based on correlations with other measures of both relational and global trust. That is, Partner Trust was most highly correlated with relational trust measures (e.g. the Faith subscale of Trust by Rempel et al., 1985), Generalized Trust was most highly correlated with global trust items (e.g. Rotter's Interpersonal Trust Scale, 1967), while correlations of Network Trust items fell intermediately between those of Partner and Generalized Trust. Construct validity was shown in that Partner Trust correlated more strongly with measures of relationship quality and stability than with global personality measures, while Network Trust and Generalized Trust items do not correlate differentially between the two kinds of measures.

This work makes an important contribution by attempting to measure global trust, trust in specific others, as well as trust in one's social network, and is consistent with our emphasis on the need to consider the contextual issues that influence trust decisions. We have argued that understanding trust within a team will require consideration of the context in which that team is embedded, as well as the broader systemic context in which trust decisions occur. Although focused more in the realm of close relationships, this work represents an important contribution to our thinking about the development of trust measures.

Work by Larzelere & Huston (1980) has conceptualized trust as stemming from a belief in the trustee being both benevolent (e.g. genuinely interested in one's welfare), as well as honest. In accordance with this conceptualization of trust, Larzelere & Huston (1980) created an 8-item scale, referred to as the Dyadic Trust Scale (DTS) to evaluate trust between partners in exclusive relationships. DTS items were borrowed from other trust scales (for a complete list refer to Larzelere & Huston, 1980) and modified to suit dyadic trust. A study was conducted with 40 dating couples (20 newlyweds and 20 married longer) using the preliminary 57 items in the Dyadic Trust Scale. On the basis of participants' responses, and factor analyses, the scale was narrowed to 8 items, as listed in Table 5:

Table 5: Larzelere & Huston (1980) Dyadic Trust Scale Items (DTS)

Item
My partner is primarily interested in his (her) own welfare (rev).*
There are times when my partner cannot be trusted (rev).*
My partner is perfectly honest and truthful with me.
I feel that I can trust my partner completely.
My partner is truly sincere in his (her) promises.
I feel that my partner does not show me enough consideration (rev).*
My partner treats me fairly and justly.
I feel that my partner can be counted on to help me.

* reverse-scored item

In terms of validity, the DTS shows a low and non-significant relationship with both social desirability and with generalized trust (e.g. Rotter, 1967). This suggests that DTS trust ratings are not driven exclusively by self-presentation concerns, and that it does measure more than individual propensity to trust. No other information relevant to the validity of this scale was available.

Johnson-George & Swap (1982) developed the Specific Interpersonal Trust Scale (SITS) to assess trust in a specific other. Item generation efforts produced 50 items describing hypothetical

situations thought to involve trust in specific others. The majority of these items fell into 4 a priori categories, including:

- trusting another with material possessions,
- trusting another with personal confidences,
- belief in the other's dependability and reliability,
- trusting another with one's physical safety.

These items were then presented to 15 judges, who rated each item in terms of its importance as a determinant of trust, and the 43 items with the highest interjudge agreement were retained.

Johnson-George & Swap (1982) further refined the SITS after a factor analysis revealed that trust was influenced by different components for men and women. The SITS was divided into the SITS-M (males) containing overall trust, emotional trust and reliableness subscales, and SITS-F (females) containing subscales for emotional trust and reliableness only. Sample items for both scales are presented in Tables 6 and 7.

Table 6: Sample Items of the SITS-M (Johnson-George & Swap, 1982)

Item	Designated Subscale
If __ gave me a compliment I would question if ___ really meant what was said (rev).*	Overall Trust
If __ unexpectedly laughed at something I did or said, I would wonder if he/she was being critical and unkind (rev).*	Emotional Trust
If my alarm clock was broken and I asked __ to call me at a certain time, I could count on receiving the call.	Reliableness

* reverse-scored item

Table 7: Sample Items of the SITS-F (Johnson-George & Swap, 1982)

Item	Designated Subscale
If I were injured or hurt, I could depend on __ to do what was best for me.	Reliableness
If __ couldn't get together with me as planned, I would believe his/her excuse that something important had come up.	Emotional Trust

Two studies were then conducted with undergraduates to explore the validity of the emergent scales. In short, these studies involved manipulating trust in newly formed "partnerships", and administering the SITS. These studies show some support for the validity of the scale. As would be expected, people in partnerships that were manipulated to be high in trust did show high trust ratings on the SITS, and vice versa. This suggests that the scale is capable of capturing variations in trust. Further analyses to evaluate the convergent and discriminant validity of the revised SITS items, however, were not provided.

Omodei & McLennan (2000) developed the Interpersonal Mistrust-Trust Measure (IMTM), a self-report measure of global interpersonal trust-mistrust. The scale comprised 18 items, including 9 trust and 9 mistrust situations. The IMTM scale is unique from other efforts to measure trust, as items are designed to reflect situational attributions about behaviour rather than direct self-reports

of trust in a specific person. Each scale item presents a hypothetical situation, along with a specific attribution made about the person in the situation (indicating varying levels of trust or mistrust) to that situation. The authors presented the following example:

Scenario	*Action*
You are discussing a personal difficulty with a friend. He interrupts and says that he has to leave to attend a meeting.	*Your friend is too selfish to want to listen to your difficulties*

Using a scale from 1 (*not likely to respond in this way*) to 7 (*very likely to respond in this way*), respondents indicate the degree to which they would respond this way. Half of the situations are worded positively for trust and the remaining worded positively for mistrust. Omodei & McLennan (2000) report high internal consistency and construct validity of the IMTM, based on high correlations with alternate trust scales (e.g. Rotter's Interpersonal Trust Scale, 1967) and peer-ratings of interpersonal mistrust in tests with university students. There is also some evidence of the discriminant validity, and it appears to capture more than broad personality factors (e.g. likeableness, adjustment). Ratings of mistrust, for example, are poorly explained by the Big Five personality factors of neuroticism/negative instability. This suggests that the IMTM captures more than broad styles of responding in interpersonal situations. Moreover, based on a factor analysis, the authors argue that a one-dimensional scale is suitable to measure trust, and that there is no advantage to using separate mistrust-trust scales.

As noted in the previous trust in teams review (Adams, Bryant, & Webb, 2001), the scale created by Omodei & McLennan (2000) represents a unique approach to measuring trust, in the sense that it attempts to embed trust in a more contextualized setting. Unfortunately the use of attributional statements, although novel, misses many of the important aspects of trust. Believing that one's friend is positively motivated to act in one's interests (that is, making a positive attribution about his intentions) is important. On the other hand, trust is likely to be predicated on more than just ascribing positive intentions; believing that a person actually has the abilities to perform competently is also critical.

Perhaps the most complete and relevant effort to measure trust in a specific other was untaken by Butler (1991). Butler reasoned that rather than measuring one's perception of trust toward another, it is more meaningful to measure the conditions that lead to trust. The explicit assumption of this work is that tapping conditions of trust "would lead to a corresponding dimension of the construct of trust. Conditions of trust produce trust." Butler used semi-structured interviews with managers to elicit the following:

- Characteristics of one trusted and one mistrusted person, and,
- Critical incidents that lead to trust and mistrust

These descriptions evolved into 10 conditions of trust: competence, consistency, discreetness, fairness, integrity, loyalty, openness, promise fulfillment and receptivity. These conditions of trust were then embedded into items designed to measure trust in specific others. The final scale, entitled the Conditions of Trust Inventory (CTI), consists of 4 items for each of 11 subscales; 10 representing the overall conditions of trust, and an additional overall trust subscale. Sample items are presented in Table 8.

Table 8: Items from Butler's (1991) Conditions of Trust Inventory (CTI)

Item	Designated Subscale
__ is usually around when I need him/her	availability
__ does things competently	competence
__ does things consistently from one time to the next	consistency
__ keeps secrets that I tell him/her	discreetness
__ treats me fairly	fairness
__ always tells me the truth	integrity
__ would not do anything to make me look bad	loyalty
__ tells me what he/she is thinking	openness
__ follows through on promises made	promise fulfillment
__ readily takes in my ideas	receptivity
Sometimes I cannot trust __ (rev).*	overall trust

* reverse-scored item

More than 380 students in undergraduate and graduate management courses completed the CTI in initial efforts to validate the scale. Importantly, confirmatory factor analysis suggests that most items loaded very well on their underlying dimensions, and that the 9 identified factors accounted for 74% of the total variance. Integrity was closest to the overall trust factor, suggesting that integrity is perhaps the primary determinant of trust in a specific other.

This scale showed good evidence of convergent and discriminant validity in several samples. For example, ratings of overall trust on the CTI were highly correlated with overall trust on the SITS. As expected, promise fulfillment on the CTI was also correlated with reliableness on the SITS. Emotional trust (SITS) correlated with discreteness and loyalty (CTI). Benevolence (as measured by the Dyadic Trust Scale) also correlated with loyalty (CTI). Discriminant validity was also supported by nonsignificant correlations of the CTI scores with locus of control and dogmatism.

The CTI was also tested with dyads in a role playing game, and then with vertical dyads (manager and subordinates). In the role playing game, for example, respondent scores on the CTI were highly correlated with observer's ratings of trust, suggesting construct validity. In the second study, manager and subordinate trust ratings were highly correlated suggesting construct validity and supporting the notion of the reciprocity of trust.

These efforts to validate the CTI are important, but leave many other questions unanswered. Several key relationships with other trust measures are reported, but results for several other relationships that would seem logical to have explored are not reported. This suggests that although many important relationships were significant (and in the expected direction), others were likely not. If this inference is accurate, this may speak to the validity of the scale. This caveat does not lessen the contribution of the CTI to the trust literature. These efforts to create and validate a trust inventory continue to be influential, as evidenced in its use by other trust researchers (e.g. Deluga, 1995; Korsgaard, Brodt, & Whitener, 2002).

1.3 Measuring Trust in Leaders

Some efforts to measure trust in others have focused specifically on trust in a leader. In some cases, the referents are simply changed to measure trust in a leader. Podsakoff, Mackenzie, Moorman, & Fetter (1990), for example, revised the interpersonal trust at work scale created by Cook & Wall (1980) to quantify trust in management and in peers. Podsakoff's work conceptualizes trust as faith in and loyalty toward the leader. Resulting trust in leader scale items are listed in Table 9.

Table 9: Trust in Leader at Work Scale (Podsakoff et al., 1990)

Item	Designated Subscale
I feel quite confident that my leader will always try to treat me fairly.	Faith in intentions
My manager would never try to gain an advantage by deceiving workers.	Faith in intentions
I have complete faith in the integrity of my manager/supervisor.	Faith in intentions
I feel a strong loyalty to my leader.	Loyalty to leader
I would support my leader in almost any emergency.	Loyalty to leader
I have a divided sense of loyalty toward my leader (rev).*	Loyalty to leader

* reverse-scored item

As part of a larger study, the trust in leader scale was administered to members of a petrochemical company, and the factor structure of the trust scale was examined. A confirmatory factor analysis showed that scale items loaded on one factor and the authors argue that the one factor model fit the data very well.[2] Other information that speaks to the validity of these scales is not available.

Work by Deluga (1995) represents one of the few attempts to quantify trust in a leader within the military domain. Sixty-four (64) supervisors were administered Butler's Conditions of Trust Inventory (CTI) to measure the extent to which subordinate levels of trust are facilitated by supervisor behaviour. Unfortunately, information that speaks directly to the reliability and validity of the CTI measures in this work is not available.

Korsgaard et al. (2002) also used the Butler Conditions of Trust Inventory to examine the relationship between trust in a manager and managerial trustworthy behaviour (as rated by both participants and third party observers). The authors used a critical incident method in which employees were required to think of a recent disagreement with their manager and answer generic questions related to the incident. Trust in manager was measured using 3 items from Butler's 10-item Conditions of Trust Inventory. For our purposes, the most relevant analyses involve the relationship between CTI ratings of trust in a manager and trustworthy managerial behaviour. Importantly, subordinates' ratings of the trustworthiness of managers were significantly predicted by managerial trustworthy behaviours (rated by both participants and 3rd party observers). Although only 3 items, this provides some evidence of the validity of these CTI measures, as they are correlated with ratings of both perceived and actual managerial behaviour.

[2] We question this claim, as the value of a confirmatory factor analysis model can only meaningfully be described relative to other competing models. As there are no competing models, it seems impossible to describe the one dimensional model as fitting well in an "absolute sense", as Cook and Walls (1980) argue.

Research by McAllister (1995) focuses on the factors and consequences of manager's trust in subordinates. McAllister made a distinction between two forms of interpersonal trust; affect-based trust and cognition-based trust Affect-based trust exists when "emotional ties linking individuals provide the basis for trust" (McAllister, 1995). Cognition-based trust uses reasoning and hard evidence to make trust decisions. The trust scale was created from an initial pool of 48 items based on existing interpersonal trust measures. Organizational scholars chose the 20 strongest items and categorized them as affect-based or cognition-based trust. A subsequent factor analysis revealed the 11 strongest loading items, 5 for affect-based and 6 for cognition-based, which were combined to form the final trust scale. The final trust scale items are presented in Table 10.

Table 10: Items from McAllister's Trust Scale (1995)

Item	Designated Subscale
We have a sharing relationship. We can both freely share our ideas, feelings and hopes.	Affect
I can talk freely to this individual about difficulties I am having at work and know that (s)he will want to listen.	Affect
We would both feel a sense of loss if one of us was transferred and we could no longer work together.	Affect
If I shared my problems with this person, I know (s)he would respond constructively and caringly.	Affect
I would have to say that we have both made considerable emotional investments in our working relationship.	Affect
This person approaches his/her job with professionalism and dedication.	Cognition
Given this person's track record, I see no reason to doubt his/her competence and preparation for the job.	Cognition
I can rely on this person not to make my job more difficult by careless work.	Cognition
Most people, even those who aren't close friends of this individual, trust and respect him/her as a coworker.	Cognition
Other work associates of mine who must interact with this individual consider him/her to be trustworthy.	Cognition
If people knew more about this individual and his/her background, they would be more concerned and monitor his/her performance more closely (rev).*	Cognition

* reverse-scored item

McAllister (1995) reported acceptable internal reliability of the scale, and concluded that a confirmatory factor analysis supports the view that trust has both affect-based and cognition-based dimensions. Moreover, several other relationships noted in this research speak to the validity of the measures. Frequency of interactions and peer citizenship behaviour, for example, both of which should be positively related to trust, do both contribute significantly to affect-based trust. Further, affect-based trust itself predicts positive manager monitoring (to ensure that needs are met) and manager citizenship behaviour. Although tested in the context of a much larger research question, these measures do appear to be somewhat useful.

Dirks (2000) investigated the role of trust in leader and trust in teammates in relation to team performance. Specifically, he attempted to establish whether team trust in a leader affects team performance. Using a 9-item trust scale adapted from McAllister (1995), Dirks collected trust in leader and trust in teammates ratings from 355 NCAA basketball players from 30 teams. Based on

interviews with coaches, Dirks adapted McAllister's trust instrument (1995) to reflect the experimental domain. Items included in the trust in leader scale are presented in Table 11.

Table 11: Items from Trust in Leader Scale (Dirks, 2000)

Item
Most team members trust and respect the coach.
I can talk freely to the coach about difficulties I am having on the team and know that he will want to listen.
If I shared my problems with the coach, I know he would respond constructively and caringly.
I have a sharing relationship with the coach. I can freely share my ideas, feelings, and hopes with him.
I would feel a sense of loss if the coach left to take a job elsewhere.
The coach approaches his job with professionalism and dedication.
Given the coach's past performance, I see no reason to doubt his competence.
I can rely on the coach not to make my job (as a player) more difficult by poor coaching.
Other players and coaches consider the head coach to be trustworthy.

Dirks (2000) reported high internal reliability of the trust scale in measuring trust in a leader, and a principal components factor analysis showed that scale items loaded onto a single factor accounting for 80% of the overall variance.

As part of a larger study of the predictors of combat readiness, Shamir, Brainin, Zakay, & Popper (2000) investigated the reciprocal role of trust on perceived combat readiness in a non-combat military setting. Trust was defined as company confidence in leader and leader confidence in company. From a total of 50 field companies, 50 company leaders were asked to rate their level of confidence in the company and 1197 soldiers were asked to rate their level of confidence in the leader. The confidence in the leader measure was based on the aggregation of 4 items, listed in Table 12:

Table 12: Trust in Leader Items from Shamir et al. (2000)

Item
I have complete trust in him.
I fully trust his decisions and judgement.
I tend to trust his ability to overcome any obstacle.
In time of war, I would follow him blindly.

The confidence in the company measure included the same questions worded to reflect the referent of company rather than leader. Individual scores for confidence in company and confidence in leader were aggregated to allow group level analysis. It is important to note that confidence in the leader was a significant predictor of combat readiness, but leaders' confidence in teams was not. No other information directly relevant to reliability or validity is available.

Recent empirical work within the military addresses the importance of confidence in a leader (Murphy & Farley, 2000). Confidence in a leader[3] is one of the key dimensions of the Unit Climate Profile measurement scale. The Unit Climate Profile (UCP) was developed in order to assess the ongoing milieu within military units, with respect to cohesion, morale and confidence in leadership. Although there have been several different versions of the UCP, early versions measured confidence in specific leaders at all different levels, as indicated by the sample items in Table 13:

Table 13: Trust in Leader Items from Murphy and Farley (2000)

Item
My Section Commander is respected by section members.
My Platoon Warrant Officer stands up for the troops.
In the event of combat, I have confidence in my Platoon Commander.
My Company Commander is respected by those in the company.

The UCP has been piloted in many different contexts. Murphy and Farley (2000) report findings from a pilot with an infantry company. Trust in leader was tracked at pre-deployment (48 hours before) and at several points during an operation. Results suggest that the UCP appears to be able to capture subtle changes in trust in leadership over time in an operational setting. Dobreva-Martinova (2001) replicated this work and found similar results.

Few available efforts have explored the psychometric properties of the Unit Climate Profile. Work reported by Dobreva-Martinova (1999; cited in Dobreva-Martinova, 2001) reports the results of a survey with 614 Canadian Forces personnel serving on a peace support mission in Bosnia. Exploratory factor analysis produced 12 subscales, mostly with good reliabilities, and accounted for 66% of the variance in UCP scores. A re-analysis of 5 other sets of UCP data collected during Balkans operations in the 1990's explored the patterns of confidence in leadership between leaders and over the course of deployments, but provided little exploration of the psychometric properties

[3] This concept, as described through this work, is equivalent to trust in a leader.

of the UCP. As such, it is difficult to know the extent to which this instrument, used to measure trust in leadership, is reliable and valid. Hopefully, future work indicated in Dobreva-Martinova (2001)[4] may provide insight into these issues.

1.4 Measuring Trust in Teams and Groups

More recently, researchers have extended the notion of trust toward a specific other and have measured trust at a team or group level. Again, much of this research has been in the area of organizational behaviour.

Cook & Wall (1980) introduced measures of interpersonal trust in the organizational context. The interpersonal trust scale comprises two subscales: faith in intentions and confidence in actions. Both the faith in intentions and confidence in actions subscales include three questions focusing on peers and three questions focusing on management. Respondents are asked to rate their faith in the intentions as well as their confidence in the action of both work peers and management. Sample items from both subscales are presented in Table 14.

Table 14: Sample Items From Interpersonal Trust at Work Scale (Cook & Wall, 1980)

Item	Designated Subscale
Management at my firm is sincere in its attempts to meet the worker's point of view.	Faith in intentions
I have full confidence in the skills of my workmates.	Confidence in actions
Our management would be quite prepared to gain advantage by deceiving the workers.	Faith in intentions
Management at work seems to do an efficient job.	Confidence in actions

Cook & Wall (1980) reported good inter-item correlations for a sample of 260 participants (male, full-time employees in manufacturing industries), but very modest test-retest reliability ($r = .60$, $p < .001$). Moreover, although factor analyses show that the items load as predicted on the underlying constructs (e.g. management vs. workers) there is only limited evidence that speaks to the validity of this scale. The trust scales, for example, do correlate substantially with the organizational commitment subscales, and the trust in peers subscale is unrelated to organizational loyalty. Trust is, as expected, correlated with job satisfaction. Given the lack of validation of the interpersonal trust at work scale against other existing trust scales, however, it is difficult to judge the validity of this scale.

Cummings & Bromiley (1996) empirically developed the Organizational Trust Inventory (OTI), a set of items for measuring trust between the units of an organization or between organizations. The OTI was built on the assumption that trust has three components, each of which should be assessed. These components of trust include affective states, cognitions and intended behaviours. Moreover, the authors defined conceptualized trust as including the following 3 dimensions:

- a person being trusted is behaviourally reliable and behaves to fulfill commitments,

[4] This work was indicated in Dobreva-Martina's 2001 report, but does not appear to have been published.

- a person's statements and behaviour prior to making commitments are consistent with a person's real desires and facts as the person knows them
- a person does not take short run advantage of opportunities to gain at the expense of another (Cummings & Bromiley, 1996).

In order to develop items for the OTI, a group of five graduate students met over a period of six months and developed questions relating to the three dimensions of trust. Items were designed to meet five constraints, namely:

1) Items could not use the word trust
2) An approximately equal number of items should be developed for each dimension
3) Questions reflect the affective, cognitive and intended behavioural components of trust
4) Items to be as simple as possible, and contain only one verb
5) Items to be phrased at the group or unit level

From an initial pool of 273 items, the group then narrowed them to 121 on the basis of face validity and agreement on the meaning of items. Other researchers unfamiliar with the items then attempted to sort each item according to the appropriate underlying dimension (e.g. keeps commitments, negotiates honestly etc.). Items that consistently failed to be sorted into the proper dimensions were excluded, and the items were further refined, leaving 62 trust questions and 19 behaviours categorized by dimension and response mode.

The authors evaluated the items with a sample of 323 MBA students with sufficient and appropriate work experience to report their work unit's perception of other work units. Confirmatory factor analyses were conducted in order to explore the validity of the scale items and their underlying structure. Initial analyses showed that the scale items loaded relatively well on the expected underlying dimensions, but the intended behaviour items were somewhat more inconsistent. The full version of the OTI that emerged consisted of 62 items.

Cummings & Bromiley (1996) realized that the full OTI may be overly long, and consequently developed a short form by retaining the affective and cognitive items that exhibited the highest item-to-factor correlations, discarding the intended behaviour items and other items with redundant wording. This resulted in the short version of the OTI, shown in Table 15:

Table 15: OTI Short Form Items (Cummings & Bromiley, 1996)

Item	Component
We think people in ___ tell the truth in negotiations.	Cognitive
We think that ___ meets its negotiated obligations to our department.	Cognitive
In our opinion, ___ is reliable.	Cognitive
We think that the people in ___ succeed by stepping on other people (rev).*	Cognitive
We feel that ___ tries to get the upper hand (rev).*	Affect
We think that ___ takes advantage of our problems (rev).*	Cognitive
We feel that ___ negotiates with us honestly.	Affect
We feel that ___ will keep its word.	Affect
We think ___ does not mislead us.	Cognitive
We feel that ___ tries to get out of its commitments (rev).*	Affect
We feel that ___ negotiates joint expectations fairly.	Affect
We feel that ___ takes advantage of people who are vulnerable (rev).*	Affect

* reverse-scored item

The Cummings & Bromiley (1996) work has been influential on our thinking about measuring trust from several different perspectives. First, it is based on explicit theory about the core underlying dimensions of trust in the workplace (i.e. keeping commitments etc.). Moreover, this work also attends to the commonly overlooked distinction between the cognitive and affective components of trust, as well the fact that trust, in theory, should be associated with an intention to behave differently (e.g. to accept risk). These contributions have been influential in our thinking about how to measure trust in small military teams.

Other research has tailored items used in previous efforts to measure trust. Work by Dirks (1999), for example, measured trust by changing the referent in McAllister's (1995) 10-item trust scale to "team". Dirks (1999) reports a high internal reliability for this trust scale and a principal components analysis showed that all the items loaded into a single factor. Subsequent work by Dirks (2000) also used the same altered scale, and showed good reliability, and a single factor structure accounting for 77% of the overall variance. Unfortunately, no other information relevant to the validity of this scale is available.

Simons & Peterson (2000) investigated the role of intragroup trust in task conflict versus relationship conflict in management teams. Individual members of 70 management teams completed a 5-item trust scale constructed by the authors and composed of the following items:

Table 16: Trust Scale used by Simons & Peterson (2000)

Item
We absolutely respect each other's competence.
Every executive present shows absolute integrity.
We expect the complete truth from each other.
We are all certain that we can fully trust each other.
We count on each other to fully live up to our word.

The authors reported high internal reliability for the trust scale, but no validity information is available.

Costa, Roe, & Thaillieu (2001) also investigated the effect of team trust on performance effectiveness. Team trust was measured using Butler's (1991) CTI, Wrightman's (1961) perceived trustworthiness subscale (e.g. "In my team some people have success by stepping on other people"), an 8-item cooperative behaviours scale (e.g. "In my team we provide each other with timely information") and a 3-item monitoring behaviours scale (e.g. "In my team people check whether others keep their promises"). Team scores represented an aggregate of individual scores, with 3-6 individuals per team. Costa et al. (2001) reported that factor analyses that distinguished between propensity to trust, perceived trustworthiness, and cooperative and monitoring behaviours support the discriminant validity of these measures. With the exception of monitoring behaviours, all other components of trust were positively related to the overall trust factor. Convergent validity of the trust component subscales was not reported.

1.5 Implications for Future Measures of Trust in Teams

First, it is heartening that existing measures do seem to express relatively common underlying assumptions and beliefs about what trust really is. The trust measures that we have reviewed indicate that there is relatively good theoretical agreement about the core components of trust. Although the emphasis of any given researcher varies and the measurement approaches also vary, it is clear that the key underlying features of trust are fairly common across researchers. In the long term, this suggests that although there will remain many diverse approaches, how trust is actually measured at a conceptual level may increasingly converge over time.

Trust in specific others has generated the most attention, but this work has not always been directly relevant to the issue of trust in small military teams. The majority of work focuses on the intimate relationship domain (e.g., marital relationships), and is of limited utility for our work, other than by providing information on methods for scale creation and validation processes.

Our review of the trust measurement literature suggests that, in general, existing measures have been poorly validated. At all levels, both in exploring generalized trust and trust in specific others, there has been surprisingly little sustained effort directed at validating measures that have been used. All too often, authors seem content to report the internal reliability of the measurement tools that they use, with little attention being paid to the validity of these scales. Even when more care is taken to assess the validity of scales, however, these efforts have typically not extended beyond a single paper and none build sequentially. In terms of validation, then, both measures of trust in teams and trust in a leader are still at a relatively early stage of development, and several core issues remain to be addressed.

In part, this state of affairs may exist because the primary goal of trust researchers has not often been to create and validate measures. Measures have typically been created to use in experiments in order to help answer specific questions about trust. Indeed, the goal of many creators of trust measures has been to understand trust dynamics and influences, rather than to establish a long term measure of trust. Whatever the reason, however, a current and properly validated scale of trust in teams does not appear to exist. The same is true of trust in a leader. In the long term, this lack of appropriate trust measures has the potential to slow the growth and accumulation of knowledge about trust.

It is also important to note that the subject pools used to test existing measures are also potentially problematic, as true members of small teams have yet to be used. It is not clear whether the same underlying trust dynamics exist in teams that have been constructed purely for the sake of research,

compared to true teams. Small military teams face specific unique challenges that may well affect how trust within these contexts should be measured. Yet, there are no existing efforts that have been both specifically developed for the military domain, and which have been broadly validated.

Unfortunately, existing trust measures have not always followed good scale creation technique. An important principle of item generation, for example, is that items should contain only one discrete thought. For items with two different components, it is impossible to know whether participants agree equally with both parts of the item. If they did not, then the process by which participants narrowed their views about these items to only one response is unclear. Several of the trust measures that we have reviewed in this section show this problem (e.g. Rempel et al., 1985 – "In general, my partner does things in a variety of different ways. He/she almost never sticks to one way of doing things."). This item contains two potential different thoughts, related to doing things in many different ways, as well as failing to persevere in performing tasks. For any given person, one might endorse one part of the item without necessarily agreeing with both parts. In order to have the best possible chance of systematically validating trust measures, then, it will be important to follow good scale creation technique.

In general, efforts to measure generalized trust (or propensity to trust) are lacking. The fact that there have been several efforts to do so without much success have lead some researchers to conclude that perhaps propensity to trust is simply not an important variable. It may also be the case that the inability of generalized trust to explain variance may also be due to the inadequacy with which it has been measured in the past. There is clear theoretical agreement in the trust literature that individual differences in trusting will exert an influence. As such, it seems important to find a more adequate way to measure propensity to trust.

The goal of our work, then, is to create measures of trust in teams (and trust in the leader of a small team) that will be relevant to understanding trust in military teams. Just as importantly, systematic efforts to truly assess and report the validity of these measures will also be undertaken. It will be important to empirically show a strong relationship between these measures and other related measures of trust and team dynamics. The first iteration of the trust scale, described in the following section, used several subscales in order to measure trust in teams. In addition, in light of the recognized importance of generalized trust, and the apparent inability of existing measures to capture it adequately, this will be a secondary goal of our ongoing trust measure research.

THIS PAGE INTENTIONALLY LEFT BLANK

2 Considerations for Measures of Trust

2.1 Pragmatic Requirements and Conceptual Decisions

Before creating a scale to be used to measure trust within teams and leaders it is important to consider the kind of measurement tools that are needed. Understanding the future contexts in which the scale is likely to be administered, for example, seems critical. Military teams perform in a range of environments, often in close proximity, and face a range of both physical and psychological stressors. A measure to be created for this context will need to be relatively easy and quick to administer. Team members from all walks of life also possess a wide range of literacy skills, and rating scales need to be consistent with both high and low levels of literacy.

Another important requirement is that the trust scales have face validity. Face validity, of course, refers to the extent to which the measure seems to capture what it intends to capture. Particularly within a military context, where participants often face numerous requests from research establishments to complete questionnaires of varying perceived levels of importance, having good face validity is critical. In fact, the concern with face validity seems to be particularly prevalent within the military domain (Kelly, Boardman, Goillau, & Jeannot, 2001). If measurement scales strike military participants as depicting a view of trust which does not match their experience, or which captures it in "head-shrinker" terms, this may negatively influence how participants respond, and the scale will not be useful in the long run. These pragmatic requirements need to be considered throughout the scale creation efforts, in order to produce measures that are both valid and reliable.

One issue that seems particularly surprising in the trust literature is the lack of stated concern about the ethical implications of measuring trust. As we have noted throughout our work (Adams, Bryant, & Webb, 2001, Adams & Webb, 2003), asking participants (especially members of established teams) to reflect on their trust in the other members of their team (at either a personal or team level) has the potential to put them in a vulnerable and undesirable position. This problem, however, is in no way distinct to trust research, and is also problematic within other psychological research domains. In research exploring stress and coping, prejudice and stereotyping etc., these ethical issues have been clearly identified and dealt with through stringent ethics approval processes and procedures. At this early stage of scale creation, we specifically decided to attempt to avoid placing respondents in ethically-sensitive situations by minimizing the ethical demands that may arise in the course of measuring trust in teams. This strategy is reflected in several of the conceptual decisions described in this section.

In designing a new measure, it also seems critical to articulate the conceptual decisions that were made in creating the measure. Early in the construction of the trust in teams and trust in leader scales, several different conceptual decisions were made. The first relates to the unit of analysis at which trust in teams was measured. The second relates to whether trust is measured directly (by asking specifically about trust), or indirectly (as a product of the factors believed to underlie trust). Lastly, another decision as to how specifically the scale items would reflect the context of small military teams vs. small teams in general was also made. These decisions, and their relative advantages and disadvantages, are described in the sections that follow.

2.1.1 Unit of Analysis as Team or Individual

To this point, many trust rating scales have been designed to measure trust in specific individuals (e.g. Johnson-George & Swap, 1982; Larzere & Huston, 1980; Butler, 1991). In exploring trust in small military teams, however, there is good reason to believe that asking people to rate their trust in specific individuals may be problematic from several perspectives.

Within a team context, it may be difficult to accurately report one's trust in other individual teammates, or in a team leader. Working within a team requires high levels of contact and interdependence. In such situations, people may be hard pressed to accurately reveal their true feelings because of this need for interdependence, and the ramifications that it could have on one's ability to work with other teammates if one admitted publicly that they were not trusted. Having to admit that one's specific teammates are not trusted could have negative implications within the team. Moreover, this problem of high contact and interdependence may be even more prevalent in some small team contexts, in which it may be somewhat difficult to get a high level of physical separation between team members. This may limit team members' ability to express thoughts and feelings freely.

Issues of power may also make specific judgements of trustworthiness difficult to report. Within any team, there is often either a formal power structure (e.g. in the case of appointed leaders), or an informal power structure (e.g. in the case of an established "pecking" order based on experience or length of tenure). Such power issues within team relationships may also make it more difficult if not impossible for people to report their views about a specific team member's trustworthiness accurately, perhaps for fear of retribution. Within the armed vehicle crews that we interviewed, for example, participants were clear in their disdain for some of their other teammates, and were only candid because they were assured that their responses would be confidential. Asking participants to say in writing whether or not they trust other section members may be very problematic, and even the most ardent of participants may be hesitant to do so. This suggests that a measure that asks participants to rate trust in a specific person has the potential to put them in an uncomfortable situation within the small team military context.

From a slightly different perspective, social conventions within our culture typically dictate that trusting other people is better than not trusting them. This may create social desirability concerns, where people asked directly about how much they trust other individuals may either intentionally or unintentionally bias their responses rather than report negative attitudes. This may make it more unlikely that people will report their direct trust attitudes accurately, particularly if they are negative. This may make it very uncomfortable indeed for participants to give specific ratings about other teammates.[6] Particularly within the context of small military teams, then, there are several reasons to question whether people are able and/or motivated to fully report their trust attitudes toward specific others. As such, asking specifically about trust may be problematic.

As experimenters, these issues give rise to several ethical concerns. Asking about trust in specific individuals has the potential to negatively influence team dynamics, perhaps by making issues of trust more salient than they would otherwise be. In the case of small military teams, obviously, having any kind of potential negative influence is undesirable, as the stakes of diminished performance are so high. On the other hand, this potential for damaging team dynamics must be

[6] Having said this, it is also important to note that the prospect of negatively rating one's trust in team as a whole is only slightly less difficult.

weighed against the scientific value of promoting a better understanding of trust in teams. The promise of this work, in the long term, is that it may positively influence team dynamics by providing a way to assess the ongoing status of trust, and by learning how to address trust related problems within teams. In this sense, it is necessary to ask about trust in teams. Finding the least intrusive way to do this is perhaps the best possible solution. In assessing trust within teams, it may be the case that to consider levels of trust in the team as a whole (rather than trust in specific individuals) may be less problematic, as this kind of judgement does not necessarily require specific thought about individuals. For this reason, we chose to design our scales so as to address trust in the team as a whole rather than trust in specific individuals within the team.[7]

2.1.2 Trust as a Component Judgement

The next conceptual decision that we made relates to how trust in teams is measured. Trust within teams could be measured directly, simply by asking participants how much they trust other teammates. If people are able to access and to adequately report the extent to which they trust other individuals or their team, this may be the ideal way to measure trust.

Indeed, there is some reason to be concerned about whether people are able to report their level of trust in another person accurately, by virtue of the complexity of this kind of judgement. Trust is a complex attitude, and one that is not necessarily coherent (Lewicki, McAllister, & Bies, 1998). If as the literature argues, trust is multidimensional and multi-determined, it may be difficult for people to adequately access their true summary judgement of the trustworthiness of other people.

On the other hand, there is some reason to believe that the proposed underlying dimensions of trust (e.g. competence, benevolence) may be more easily captured than trust as a whole. Giving a judgment about how competent a fellow teammate is, for example, can be perhaps more easily justified, as competence can be more objectively observed. As such, this kind of rating may be easier to gauge. At a psychological level, judgements about competence can also be argued to be somewhat less personal. It may be harder for individuals to speak specifically to their views about the trustworthiness of specific others than to say how competent these people are in performing specific skills. In this sense, rating component factors that influence trust are more constrained than a global trust judgement.

Designing a scale to be used within the military domain also poses additional challenges, as the inclusion of direct trust terms has the potential to be problematic. Within the military domain, we have noted a strong reluctance on the part of some military personnel to think in terms of trust, as trust is sometimes dismissed as a "touchy-feely thing" (Adams & Webb, 2003). Similar observations have also been noted in the domain of understanding trust in automation within the air traffic control domain (Kelly et al., 2000). As such, refraining from the direct use of trust terms may be of some benefit.

In light of these concerns, we have created a rating scale that asks about the component dimensions of trust in teams and trust in leaders. Once a decision was made to employ a component approach, then, it was critical to decide on the key determinants of trust within teams. Our prior trust work has helped us to gain a good understanding of the factors most likely to underlie trust in teams, and trust in a leader. Previous work includes a comprehensive review of the literature relevant to trust

[7] Obviously, an individual unit of analysis was needed to assess trust in leader.

measures (Adams, Bryant & Webb, 2001), and led to the creation of a model of trust in small teams (Adams & Webb, 2003). The model suggests that the most important dimensions influencing trust expectations about another person are competence, benevolence, integrity and predictability. Therefore, within our trust in teams scale, these dimensions were each represented in separate subscales.

Measuring these dimensions would allow access to probable trust judgements, and would do so indirectly, perhaps circumventing both pragmatic and ethical problems with asking the question directly. The issues of power may also be somewhat lessened with this approach, as saying that someone is less than competent may not have the same power as saying that they are not trusted. This kind of scale would also circumvent potential problems with the military view of trust as being too affective. Even if members of the military community are unsure about the term "trust", they are unlikely to disagree with competence and integrity being important factors by which to judge their teammates.

Using such an approach, however, also has potential disadvantages. In a very real sense, measuring trust by way of accessing the underlying dimensions of trust will only be successful if the underlying components actually do comprise the most important aspects of trust. If, for example, believing that one's teammate is competent does not always have implications for one's trustworthiness in this person then the measure, by design, will fail. Nonetheless, in light of both the conceptual and pragmatic considerations that give pause about the probable success of a measure based only on summary trust, the component approach seems the most tenable for understanding trust in military teams. Moreover, from the review in the previous chapter, employing more of a component approach has clearly been the choice of many other trust researchers, perhaps for some of the same reasons.

2.1.3 Maintaining Scale Generalizability

A decision was also made to create a scale that could be used to assess trust in many different kinds of small teams. These teams might include varying kinds of military teams (e.g. armoured vehicle crews, command and control teams, Navy operations teams such as anti-air warfare teams), as well as trust in small teams outside of the military context. These teams might include emergency services crews (e.g. ambulance, firefighting teams), teams within organizations (e.g. management teams, product development teams). As noted earlier, a good measure of trust in teams does not currently exist. As such, designing and being able to validate this measure could make an important contribution to both the military literature, and to the broader psychology/team literature.

A potential disadvantage of this decision is that it might lessen the face validity of the scale, and/or the realism of it to military life. It would have been possible, for example, to tailor the items to address specific activities conducted within an infantry operation (e.g. performing a recce as a team). On the other hand, these kinds of activities would not necessarily be applicable when assessing trust within Navy or Air Force teams, or in many of the other contexts in which a future scale of trust in small teams may be applied.

In addition, we attempted to use wording that would be applicable within the military domain, but not entirely limit extension beyond this domain. If it can be shown that this measure has both face validity as well as broader validity when used in the military context, then it makes some sense to keep it at a more general level. If these item stems are validated, it may be possible to test more specialized kinds of questions in the specific domain of interest.

THIS PAGE INTENTIONALLY LEFT BLANK

3. Creating and Analyzing the Trust Scales

After having considered the pragmatic requirements for the trust scales, and after having made several key conceptual decisions in order to address potential theoretical and ethical issues, we began the process of designing two scales to measure trust in small teams and trust in a leader.

3.1 Creating Scale Items

The process of scale creation began with a series of meetings with two trust experts working together to generate items for each of 5 subscales. Our explicit goal at the outset was to create a broad range of items addressing all aspects of the 4 most important factors seen to influence trust in small teams (competence, benevolence, integrity and predictability), as well as a sampling of other lesser factors indicated in the model to influence trust in small teams (e.g. communication, shared values etc.). This "other" factor was created in order to ensure that our assumptions about the 4 primary factors as being the most influential was correct. [8]

Scale items were created primarily by brainstorming for each of the 4 core concepts (competence, integrity, benevolence and predictability), generating alternate words related to the core concepts, and combining with both general and specific contexts that would be relevant within small teams. Several items used in existing measures of trust were also adapted and used as part of our scale items.

In accordance with established scale construction procedures (e.g. Cummings & Bromiley, 1996), we also adopted the following constraints.

- Items did not use the word trust.
- An approximately equal numbers of items were developed for each subscale.
- Items contained cognitive, affective, and intended behavioural components of trust.
- Items were phrased at the team or section level.
- Items expressed only one idea.

We created a combination of positively and negatively worded items that could be broadly applicable to teams in the workplace in general.

In all, then, 40 items were created for each trust in teams subscale. The decision to use a high number of items at the initial stage of scale creation was prompted by the novelty of the domain, and a need to understand the kinds of items that would work best within this domain, from two perspectives. In keeping with our thinking about trust, trust within a team is likely to be predicated on the perception of a personal relationship with one's teammates. Trust is not just about the qualities that other people are seen to have, but how these qualities impact on the individual. Thus, scale items included both a subset with personal referents (e.g. I have faith in the integrity of my teammates) as well as more impersonal referents (e.g. My teammates have integrity). Although we

[8] After initial exploration, it was evident that this subscale did not impact substantively, it was not included in the subsequent analyses.

expected that the personal references would work better, we included the more impersonal referents as well in order to test this assumption.

Trust is argued to become an issue in situations involving risk, vulnerability, uncertainty and the need for interdependence. As such, a scale to measure trust in teams should tap both trust related concepts (e.g. predictability and integrity), as well as to create a context particularly likely to give rise to issues of trust. In order to "push" for trust, then, some of the items were also written so as to reflect a particularly risky context (e.g. "When it really counts, my teammates keep their promises"). Within each subset, then, we also included items that were both contextualized, as well as those without a specific context (e.g. "My teammates keep their promises").

Items for the trust in leader scale were created by changing the referent from team to leader. This scale also included items related to the key dimensions of trust, including competence, benevolence and integrity as well as predictability and other less central items such as communication.

Several volunteers read the items, and reviewed them for comprehension and readability. A military SME also reviewed the full list of items, in terms of their face validity and intelligibility within the military domain. Based on this feedback, some items were revised.

It was also important to more formally explore the readability of the scale items. We assessed the readability of the scale items, and the literacy level needed to complete the scale properly. The team scale items scored 79.1% on the Flesch Reading Ease scale, and tapped a grade level of 4.6 on the Flesch-Kincaid Grade Level scale. The trust in leader scale items scored 72.8% on the Flesch Reading Ease scale, and tapped a grade level of on the Flesch-Kincaid Grade Level scale. These analyses clearly suggest that the scales are likely to be accessible even to participants with a very low level of literacy skills. At the same time, however, there is considerable room to introduce an additional level of complexity if future refinements are necessary.

After creating these items, a study was conducted in order to explore the psychometric properties of these scales. Members of small military teams completed the main questionnaires and several related questionnaires. Our goal was to understand the items that worked best, and the ones that did not, in order to revise the scale measures in preparation for more extensive validation efforts. At the same time, we were also interested in qualitative feedback about the scales, and about how well they represented trust within a military context.

3.2 Method

3.2.1 Participants

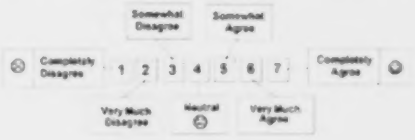
This study was conducted over a 3-day period (Oct. 25 to 28, 2002) at CFB Petawawa. Participants were active regular force members of 1 Royal Canadian Regiment (1 RCR), and included a broad range of both non-commissioned and commissioned personnel. The initial criteria offered to the regiment was that we needed current members of small infantry teams, but the personnel provided to participate in this trial did not necessarily meet this stringent criteria. Nonetheless, regardless of their current position, as members of the military establishment, all participants either had at one point been a member of a small team, or had detailed knowledge about these teams. Participants who indicated that they did not currently belong to a small team were asked to reflect on the factors that influenced trust in other coworkers.

In all, 147 section members (or equivalent) and 50 section commanders completed the scale related to trust in other team members. For the trust in leader measure, on the other hand, only the 147 section members completed the scale related to trust in the leader of a small team. Several scales (N = 16) were identified as unusable, as participants failed to follow instructions. These questionnaires were excluded from further analyses.[9] Hence, a total of 181 questionnaires were included in the final analysis.

3.2.2 Questionnaires Administered

Participants completed several questionnaires. The primary questionnaires contained items addressing trust within teams (or trust in the leader of the team), and used the following question:

USING THE SCALE PROVIDED, INDICATE THE EXTENT TO WHICH YOU AGREE WITH THE FOLLOWING STATEMENTS WITH RESPECT TO YOUR CURRENT SECTION OR TEAM



After having completed the trust questionnaires, participants were also asked to give feedback about the trust scales using questionnaire ratings with two parts. Due to the length of the actual trust questionnaire, feedback was solicited from each participant on only a random subset of the items from the questionnaire, and participants were asked to indicate items that they had difficulty understanding or which were unclear. The second part of this feedback questionnaire asked participants to rate the extent to which the depiction of trust in the trust scales matched with their experience. In order to provide open-ended feedback about their experience in completing the trust scales, participants were also provided with a section for their written comments.

In addition to the trust in team and leader scales, participants also completed several other questionnaires. As a good measure of propensity to trust does not currently exist, several items tapping the generalized propensity to trust other people other people was also included in the

[9] Preliminary analyses including these scales did not differ substantively.

questionnaire set. This 7-item scale was created on the basis of our review of other measures of generalized trust, and of our understanding of the trust literature. Lastly, in order to better understand the operational experience of team members and the team history (e.g. duration as a team), participants also completed experience and team history questionnaires.

The full set of questionnaires administered to the section members and section commanders is listed in Table 17 below:

Table 17: Questionnaires Administered

Team/Section Members	Section Commanders
Experience and Team History	Experience and Team History
Trust in Teams Scale	Trust in Teams Scale
Trust in Leader Scale	
Feedback about Trust Scales	Feedback about Trust Scales
Propensity to Trust	Propensity to Trust

3.3 Results

3.3.1 Experience and Team History

Participants showed a range of operational experience, with almost 40% having no experience, 22% with 1 tour and 16% with 2 tours. In general, they had a limited amount of experience with their team members. Participants were asked how long their team or section had been together in its current form without personnel changes. More than 50% of the participants indicated that they had experienced changes within their team within the previous 3 months. In fact, only 6% of participants indicated that their teams had experienced no changes in the past year. This suggests that the teams were extremely fluid, although not necessarily different from any other teams within an infantry/military context. The majority of participants (83%) also indicated that they had no operational experience at all as a section. Importantly, however, there did appear to be a good deal of familiarity with other team members at both a professional and a personal level, with 85% of participants indicating that they knew their current team members well in a work a context, and 86% indicating that they knew their current team members well at a personal level.

3.3.2 Trust in Teams Scale

Data from the trust in teams scale was analysed in several steps. First, items with low item-total correlations were removed. A preliminary factor analysis was then conducted in order to explore the underlying structure of the data. This analysis, however, was problematic. Early factor analyses indicated three distinct dimensions, and the majority of the scale items could be easily interpreted to be underlying dimensions of the benevolence, integrity and predictability subscales. The problem at this point, however, was that the competence items did not form a unique factor on their own, but appeared to have been dispersed throughout the other dimensions. Separate analyses on the competence items showed that these items loaded mainly on two dimensions, but these dimensions were not meaningful at a conceptual level.

In light of an initially uninterpretable factor structure with the competence subscale items included, a decision was made to exclude the competence items from further analyses, and to focus on

whether a meaningful factor structure could be ascertained with the remaining items. At this exploratory stage, then, analyses proceeded without the competence items.

A principal component factor analysis with varimax rotation provided the most interpretable factor structure. Scale items with double loadings (.3 or greater) were excluded. The analyses showed that items related to benevolence, predictability and integrity formed relatively distinct factors. The first factor that emerged, integrity, accounted for the largest portion of the variance (32.8%), but predictability and benevolence also contributed significantly (17.5% and 8.0%, respectively). Each of these factors and associated alphas are listed in Table 18:

Table 18: Trust in Team Subscales – Factor Structure, Alphas and Variance Explained

	Component		
Scale Item (I = Integrity, P = predictability, B = benevolence)	1 (Integrity)	2 (Predictability)	3 (Benevolence)
I know my teammates tell the truth (I)	**.7**	-	.2
I can depend on the fairness of my teammates (I)	**.6**	.3	.2
When it really counts, my teammates keep their promises (I)	**.7**	.3	.1
No matter what, I can rely on the word of my team (I)	**.8**	-	.3
I believe in the integrity of my team (I)	**.8**	.1	.3
During the toughest times, my teammates are honourable (I)	**.6**	-	.2
Even when times are tough, I believe that my teammates have strong ethics (I)	**.8**	.2	.2
I have faith in the integrity of my teammates (I)	**.8**	.2	.2
I am confident about the integrity of my teammates (I)	**.7**	.3	.2
I know what to expect from my team (P)	.2	**.8**	-
I never know what to expect from my teammates - rev (P)	-	**.7**	.2
One never knows what my teammates are likely to do – rev (P)	.2	**.7**	-
My teammates behave in a very consistent manner (P)	.2	**.8**	-.2
My teammates' actions are reliable (P)	.2	**.8**	-
Even when we run into hard times, I always know how my teammates are going to react (P)	.2	**.8**	-
My team has a common understanding of what to do in high risk situations (P)	-	**.8**	-
I can often guess what my team members are likely to do. (P)	-.2	**.8**	-
My team shows interest in my personal pressures (B)	.1	-	**.5**
In high risk situations, my team is motivated to protect me (B)	.3	-	**.7**
In tough times, my team members are there to support me (B)	.4	-	**.7**
My teammates worry about my well being (B)	.1	-	**.8**
My team members are indifferent to my needs - rev (B)	.2	-	**.8**
I am sure that my teammates have my best interests in mind (B)	.2	.2	**.6**
If I really need them, my teammates are there for me (B)	-	0	**.7**
Subscale reliability (α)	.91	.90	.90
% Variance Explained	32.8%	17.5%	8.0%
Cumulative % Variance Explained	-	50.3%	58.3%

As Table 18 shows, the reliability of these items was also very high with all alphas above .9, with 58% of the overall variance in the proposed components explained by the scale items.

The correlation matrix seen in Table 19 below provides insight into the complex relationships between the scale and the subscale totals for the team and leader scales. Comparing the relationship between team trust on the scale measure and the leader trust scale, for example, suggests that these two constructs are relatively highly correlated, $r = .56$, $p < .01$.

Table 19: Correlation Matrix for Team and Leader Scale and Subscales

Trust in Team	Team Integrit	Team Predic	Team Benevol	Team Compet	Team (all)	Leader Integrity	Leader Predict	Leader Benevol	Leader Compet	Leader (all)
TIntegrity	1.0	-	-	-	-					
TPredictabilit	.38**	1.0	-	-	-					
TBenevolenc	.54*	.11	1.0	-	-					
TCompetenc	.75**	70**	.73**	1.0	-					
Team (All)	.85**	.50**	68**	.84**	1.0					
LIntegrity	.47**	-.14	.57**	.52**	.39**	1.0				
LPredictabilit	.73**	.07	.12	.39**	.47**	.43**	1.0			
LBenevolenc	.28**	.59**	-.19	.07	.39**	.22**	.33**	1.0		
LCompetenc	.31**	.49**	.16	.44**	.48**	.52**	.24**	.65**	1.0	
Leader (All)	.66**	.20*	.27**	.46**	.56**	.79**	.78**	.68**	.63*	1.0

** Correlation is significant at the 0.01 level (2-tailed) * Correlation is significant at the 0.05 level (2-tailed)

At a conceptual level, it is encouraging to see a strong relationship between trust in leader and trust in teammates. On the other hand, these constructs are also not completely overlapping and there is a significant amount of the variance in them left unexplained. This suggests that it is valid (and even important) to make a conceptual distinction between trust in teams and trust in the leader of the team. Comparing the core concepts in the team and leader scales shows that competence ($r = .44$, $p < .01$ and integrity ($r .47$, $p < .01$) are significantly correlated, but predictability ($r = .07$) and benevolence ($r = -.19$) are not. This suggests that predictability and benevolence may well take different forms for teams as opposed to leaders.

In order to better understand the relationship between the core subscales and the problematic competence items, indices were created for the best competence items (using item-total correlations) and the overall team and leader items (all concepts combined). Looking at the correlation matrix suggests that one of the problems with the competence subscale is that it is highly correlated with other subscales. Within the team trust items, for example, team competence is highly correlated with team integrity ($r = .75$, $p < .01$), benevolence ($r = .73$, $p < .01$) and predictability ($r = .70$, $p < .01$). As such, the competence items did not seem to be distinct on their own, but appeared to have tapped the integrity, benevolence and predictability dimensions. The relationship between leader competence items and leader subscale indices are somewhat weaker, but still significantly correlated. As written, then, the competence items do not seem to tap a distinct dimension on their own.

3.3.3 Trust in Leader Scale

For the trust in leader subscale, items with low item-total correlations were again removed. In an initial factor analysis, the competence items did not form a unique and distinct factor, and the competence items were dispersed throughout the other dimensions. Analyses proceeded without

the competence items. Principal component factor analysis was then conducted on the items from the benevolence, integrity and predictability subscales.

Another principal components factor analysis with oblique rotation was then conducted, and this analysis resulted in three factors with eigenvalues greater than 1.0, confirmed with a scree plot. Scale items with double loadings (i.e. those items loading on two factors with a value of .3 or greater) were excluded. In all, these 3 factors accounted for 63.6% of the variance in the underlying construct (hypothesized to be trust in a leader). The structure that emerged matched the underlying hypotheses about the constructs that the items were intended to tap (i.e. integrity, predictability and benevolence) quite well, as shown in Table 20 below.

Table 20: Trust in Leader Subscales – Factor Structure, Alphas and Variance Explained

	Rotated Component Matrix		
Scale Item (I = Integrity, P = predictability, B = benevolence)	1 (Integrity)	2 (Predictability)	3 (Benevolence)
I can depend on the fairness of my leader (I)	**.8**	.1	-
When it really counts, my leader breaks his promises - rev (I)	**.8**	-	-
When times are tough, I know my leader will keep his word (I)	**.7**	.2	-.2
I believe that my leader is honest (I)	**.6**	.4	.3
My leader has poor ethics – rev (I)	**.8**	.2	.2
In times of uncertainty, I know I can rely on my leader (P)	.3	**.6**	.3
My leader behaves in a very consistent manner (P)	.2	**.7**	.1
Even in the worst possible situations, I know how my leader is going to act (P)	.2	**.8**	-
I know exactly my leader will do in difficult situations (P)	-	**.7**	.2
I can anticipate my leader's actions before he does them (P)	0	**.7**	-.1
My leader makes me feel valued (B)	.2	.3	**.5**
My leader is genuinely concerned about my well being (B)	-	-	**.9**
My leader cares personally about my survival (B)	.2	-	**.8**
My leader always has my best interests in mind (B)	-.1	-	**.8**
Subscale reliability (α)	.86	.84	.78
% Variance Explained	34.3%	12.5%	16.7%
Cumulative % Variance Explained	-	47.8%	63.6%

The predictability, benevolence and integrity subscales were highly reliable with alphas ranging between .78 and .86.

Several other explicit measures related to trust and to teams had also been included in the test package given to participants. These included single item measures of participants' trust in their team and their team leader, items related to how important trust as a concept is in varying kinds of relationships, propensity to trust and team history. Results for these measures are explored in the sections that follow.

3.3.4 Single Item Measures of Trust in Team and Leader

Participants were also asked to rate their trust in their specific section members, their specific leader, and their trust for other people in general on a scale ranging from 0 (extreme distrust) to 100 (extreme trust). These ratings will henceforth be referred to as the single item measures of trust. Results are shown in Table 21 below:

Table 21: Descriptives for Single Item Measure of Trust in Team and Leader

	Mean ± StDev
Single Item Measure of Trust in Section Members (n = 147)	76.2 ± 19.7
Single Item Measure of Trust in Team Leader (n = 136)	70.3 ± 28.5
Single Item Measure of Trust of Others in General (n =	68.6 ± 19.7

Trust in one's own team members was the highest at 76%, followed by trust in one's team leader and then trust in people in general. In light of previous work (Adams and Webb, 2003), these results are perhaps unsurprising in the sense that teams varied broadly in terms of their history together, and were experiencing frequent and pervasive turnover. Indeed, it may have been impossible to fully develop trust to a deeper level, as teams had not performed together on actual operations. As such, these judgements of the trustworthiness of other teammates may well be indicative of a more conditional or provisional form of trust than would develop during the course of actual operational experience together. Trust in one's leader is also moderate at 70%, but both teammates and leaders are trusted more than people in general. This suggests that even though trust in teams and leaders is not extremely high within these military teams, it is higher than for the average person in society.

3.3.5 Importance of Trust Ratings

Participants were also asked to rate the extent to which trust was important in their relationships with their section members, their team leaders, and in general in their relationships with others, on a scale from 0 (not at all important) to 100 (extremely important). Related means and standard deviations are shown in Table 22 below:

Table 22: Importance of Trust Ratings

	Mean ± StDev
Importance of Trust in Section Members (n= 147)	92.3 ± 9.7
Importance of Trust in Team Leader (n = 136)	94.0 ± 8.5
Importance of Trust in General (n = 84)	88.6 ± 15.5

In general, participants saw trust in both their teammates and their team leaders to be "extremely important", and somewhat more important than trust in other people generally. Trust in others generally was rated as "very important".

The fact that military personnel (both members and leaders) see trust in their team as extremely important is very gratifying, and matches very well with our experiences in conducting focus groups in infantry teams, as well as in armoured vehicle crews (Adams and Webb, 2003). With

rare exceptions, there is little disagreement from the people that know the military context well that trust in small military teams is critical.

3.3.6 Propensity to Trust

The trust literature frequently argues that propensity to trust impacts on peoples' ability and motivation to develop trusting relationships. It seems likely that it may also influence the development of trust within small military teams. As such, several items to tap a generalized propensity to trust other people were included in the set of questionnaires. This scale included items such as "I usually have faith in other people" and "I typically think the worst of someone until they prove me wrong" (reverse scored). Participants rated their propensity to trust other people by rating their agreement with these items on a scale ranging from 1 (completely disagree) to 7 (completely agree). As Table 23 shows, the mean was above the midpoint of the scale, suggesting that participants endorsed a relatively positive propensity to trust style.

Table 23: Propensity to Trust Ratings

	Mean ± StDev
Propensity to Trust (n = 181)	5.1 ± 1.0

The reliability and the factor structure of the propensity to trust scale were also analysed. These analyses showed that the items seemed to tap the same dimension, as the Cronbach alpha was more than .8, and the item-total correlations were uniformly high, ranging from .4 to .7. This suggests that the propensity to trust scale may be useful in future research.

3.3.7 Feedback about Trust Measures

We sought two forms of feedback about the trust scales. It was important to get feedback about individual scale items that were problematic, as well as to understand how well the scale measures matched military participants conceptions of trust within teams and in leaders.

To address individual items, we had included a feedback section with participants marking any items that were difficult to read, or which they did not understand. Although in general, the scale items were not problematic, a few items that several participants reported to be difficult to understand were eliminated.

In order to get feedback on the extent to which the scale matched the views that members of military teams have of trust, four questions addressed the extent to which the scale matched their own views of trust in teams and in a leader.

Table 24: Trust Scale Feedback

N = 181	Mean ± StDev
Captures my view of trust in teams	4.4 ± 1.5
Fails to capture trust in teams	4.1 ± 1.7
Captures my view of trust in leader	4.3 ± 1.4

Fails to capture trust in leader	4.1 ± 1.7

Results were somewhat mixed, in the sense that although participants rated the scale as matching their views of trust in teams and leaders (4.4 vs. 4.3 respectively), they also argued that there are ways in which their views of trust differ, as they also said that both scales also failed to capture their views of trust. It is unclear exactly how this finding should be interpreted. Given the failure of the competence items noted earlier, and in light of the perceived importance of competence within the military establishment (Adams and Webb, 2003), it may be that because of the failure of the competence items, the scales simply failed to capture trust adequately. On the other hand, it may also be the case that several of the reservations indicated in the open-ended feedback may underlie these results. These reservations are described in more detail below.

Several important themes emerged in the open-ended feedback section, in which participants were asked to give their views and comments about the scale and about the experience. It is only fair to note that agreement with our view of trust was not equivocal, and that some participants did freely express their misgivings with our work. One participant seemed to argue that trust is simply redundant within military contexts:

> *There is no choice in the military. It's black and white. Leaders are not asked to be honest or not. The mission comes first. Whether you like someone, trust them, feel that they have your well-being at heart is irrelevant. Trust is useless to soldiers in the infantry. Do what you have to do to survive and go home. Don't trust or distrust – just do! Pro Patria!*

Another participant criticized the format of our response scale, and expressed a lack of optimism about the long term impact of our work:

> *Personally, I find questionnaires that are nothing more than "fill in the bubbles", "completely disagree to completely agree" as a huge boring waste of time. That being said, the military is paying me to be here; they want me to complete this thing and I tried my best to answer honestly. I'm going to go on the assumption that the people paid to compile this information will be able to extract something useful out of the bubbles. My personal feeling is that this information will never be useful and this comment will go unread. I'll be watching for the results and changes that will occur from the questionnaire*

This participant was not alone in noting that the only way to really understand trust would be to talk directly to members of military teams, outside of the highly structured format of questionnaires.

In general, however, there was very strong support for our work to measure trust in teams, and trust in team leaders. Several participants indicated both that our view of trust matched relatively well with their own, and that trust is critical within the world that they know:

> *Trust is something that has to be there at all times not one day in, and one day out. If a person can be trusted one day and not the other you as a person tend not to trust them at all. The military today within teams these days are very much in the way that no one knows how to act because no one knows what reactions day in and day out what there reaction will be (members of a team or the leader).*
>
> *I believe that the current views of trust at a small unit or section to be sound. It will however start to become a little unclear as we move up the chain. This survey at a*

battalion or unit size would definitely address issues of trust/distrust. Generally small military teams or sections, trust is good because it is so small.

Trust to me means your word is good and your effort is as well. Our view of trust to me is the same only mine is more general.

I think trust is important to have a good fighting force. Otherwise, people will stop listening what you have to say and don't give a shit how the job gets done!

Generally, my view of trust is the same as yours. An important factor for me is seeing my leaders lead by example. Hypocrisy is very detrimental to developing trust.

Overall, most open-ended responses were positive, and indicate that the scale measures capture the most important features of trust within small military teams. In addition to this positive feedback, however, it is also critical to understand the extent to which the measures are valid and reliable.

3.4 Preliminary Validation of the Trust Scales

Several analyses were undertaken in order to explore the validity of the trust in team and the trust in leader scales. If the trust in teams scale items validly tap the construct of "trust in teams", there should be several predictable relationships between scale items and several of the other measures taken. The correlation matrix in Table 25 includes the scale totals, as well as several of the other variables measured in this study. Specific correlations of interest are described in the sections that follow.

Table 25: Correlation Matrix – Trust Scales vs. Other Questionnaires

Other Variables	Trust in Team Scale	Trust in Leader Scale	Propensity to Trust	Single Item Measure of Trust in Section Members	Single Item Measure of Trust in Team Leader	Single Item Measure of Trust of Other People
Trust in Team Scale	1.0	-	-	-	-	-
Trust in Leader Scale	.55**	1.0	-	-	-	-
Propensity to Trust	.34**	.15	1.0	-	-	-
Single Item Measure of Trust in Section Members	.52**	.30**	.18*	1.0	-	-
Single Item Measure of Trust in Team Leader	.38**	.35**	.11	.38**	1.0	-
Single Item Measure of Trust of Other People	.19**	.15	.42**	.37**	.28*	1.0

3.4.1 Single Item Measure of Trust vs. Scale Measure of Trust

The first analysis addressed the relationship between the scale measures of trust in teams and leaders and single item measures of trust. This analysis speaks most directly to the validity of the newly developed trust scales. If the trust in team scale measures what it should measure, we would expect the correlation between trust scale measures and one's explicit trust in his team (as measured by the direct, single-item measure) to be relatively high.

As the correlation matrix in Table 24 shows, the relationship between measured trust in teams and single item measure of trust in teams is positive and significant ($r = .52$, $p < .01$), and the trust scale explains more than 25% of the variance in the single item measure of trust in one's team. Moreover, looking at the trust in team scale correlations, it is also important to note that the relationship with the single item measure of trust in teams represents the strongest of all possible relationships with other variables. At the same time, however, the fact that only 25% of the variance in the single item measure of trust is explained by the scale measure lends support to the notion that finding a better way to represent competence within the scale is also worth pursuing, as there still appears to be a significant amount of variance in the single item measure of trust in teams that is left unexplained by predictability, integrity and benevolence. At this early stage, however, this analysis does support the validity of the trust in teams measure.

Similarly, the relationship between the single item measure and scale measured trust in a team leader is also positive and significant ($r = .35$, $p < .01$), and again represents the strongest existing relationship between all possible variables. Again, although the relationship between the single item measure of trust in leader and scale measured trust in a leader is not quite as robust as in the trust in teams items, it is still important that these measures are significantly related.

3.4.2 Regression Models

Several hierarchical regression analyses were conducted in order to better understand the relationships between the trust subscale measures and other measures of interest. The key question was the extent to which the trust subscales predict the single item measures of trust in teams and in a leader. A subsidiary issue was to understand the interplay between the subscales in terms of how they explained the variance in trust. There are, of course, many different approaches that one could take in order to understand the data. It would have been possible, for example, to simply enter the full set of predictors into a single regression equation. At this point, however, we chose to adopt an approach that allowed a more exploratory approach to understanding the theoretical relationships between the predictors separately, as well as to progressively explore the pattern of relationships as more predictors were entered into existing models. As such, hierarchical regression analyses were used.

In the initial set of analyses, the various subscale indices were entered into 3 hierarchical regression models with the dependent variable in all cases being the single item measure of trust in one's team. The first set of analyses is shown in Tables 26 and 27.

Table 26: Coefficient Summary of Trust in Team Regression Analyses

Model		Unstandardized Coefficients (B)	Std. Error	Standardized Beta Coefficients	t	Sig.
1	(Constant)	57.9	6.8		8.6	.00
	TBENEVOL	3.9	1.6	.2	2.5	.03
2	(Constant)	31.8	8.1		3.9	.00
	TBENEVOL	1.1	1.5	.1	.7	.49
	TINTEGRI	8.1	1.6	.4	4.9	.00
3	(Constant)	23.7	9.4		2.5	.03
	TBENEVOL	1.8	1.6	.1	1.1	.21
	TINTEGRI	7.1	1.7	.4	4.1	.00
	TPREDICT	2.4	1.4	.1	1.7	.00

Dependent Variable: Single item measure of trust in section member

Table 27: Model Summary of Trust in Team Regression Analyses

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.2	.05	.04	19.0	.05	6.4	1	125	.01
2	.5	.21	.19	17.4	.16	24.3	1	124	.00
3	.5	.22	.20	17.3	.02	2.9	1	123	.09

1 Predictors:(Constant), TBENEVOL
2 Predictors: (Constant), TBENEVOL, TINTEGRI
3 Predictors: (Constant), TBENEVOL, TINTEGRI, TPREDICT

As the weakest factor, benevolence was entered in the first model. As expected, benevolence explained a significant amount of the variance in trust in one's section members. In the next model, integrity was added to the model. With the addition of integrity, benevolence no longer made a significant unique contribution to explaining the variance in the single item measure of

trust. Predictability was then added to the model. Integrity and predictability still continued to make a significant contribution to explaining the variance in the dependent variable, and benevolence did not explain a significant proportion of unique variance. As a whole, however, this model was only marginal in terms of explaining the overall variance ($p = .09$).

A secondary goal of these analyses was to consider an idea related to the reciprocal nature of trust evidenced at several points in the trust literature (e.g. Brower, Schoorman, and Tan, 2000). Within small teams with a leader, one would naturally expect that trust in the team, and trust in the leader of that team would be at least somewhat related. In existing team research, it is clear that competence is expected to play a crucial role in the performance of teams. In hierarchical teams, where the leader is in charge of making the final decision, teams can be said to have low vertical substitutability (the ability to replace one person's skill set with another's), as team members may have a difficult time assuming the role of team leader. Moreover, large differences in expertise between the leader at one level and another at a different level of the hierarchy can also present problems to horizontal substitutability as well. Within these kinds of teams, researchers have argued that it is important to consider both the leader level as well as the team level (LePine, Hollenbeck, Ilgen, & Hedlund, 1997). In hierarchical teams, they argue,

> "….performance depends on competent performance at both the staff and the leader level because neither level can fully compensate for failures at the other level (i.e. there is low vertical role redundancy). In particular, it should be difficult for even highly competent staff to impact team performance in a positive manner if the leader is incapable (through lack of ability or effort) of translating staff-level recommendations into accurate team-level decisions."

In accordance with this line of thought, then, we wondered about the extent to which competence might impact on the relationship between the single item measure of trust and the trust subscale indices. Although the competence items were not used in assessing the factor structure of the scales being developed, we wondered whether the competence subscales would make any contribution to understanding the relationship between trust as measured in the scales and single item measure of trust. In order to understand this, the competence items that worked best in preliminary analyses (as assessed by item-total correlations) were used to create competence subscales for both the team and leader domains.

In model 4, shown in Tables 28 and 29 below, team competence was then entered into the model with the other subscale indices (e.g. benevolence, integrity etc.) already entered. Team competence did not add significantly to explaining the relationship between the trust measures. In fact, adding team competence to the model had little impact in terms of explaining variance, other than making the roles of benevolence and integrity more prominent and benevolence somewhat less prominent.

Following the Lepine et al. (1997) argument, however, it may be the case that team competence should play less of a role than leader competence. After all, in a hierarchical team such as an infantry section, the team can really only be as good, ultimately, as its leader. This suggests that trust in one's team may be influenced by the perceived competence of the team leader. This idea was explored in Model 5 in the tables below. In addition to the initial subscale items of benevolence, integrity and predictability, team and leader competence were also entered into the model.

Table 28: Coefficient Summary of Trust in Team Regression Analyses

Model		Unstandardized Coefficients (B)	Std. Error	Standardized Beta Coefficients	t	Sig.
4	(Constant)	24.9	9.4		2.6	.01
	TBENEVOL	3.4	2.0	.2	1.7	.09
	TINTEGRI	8.4	2.0	.4	4.1	.00
	TPREDICT	3.0	1.5	.2	2.0	.04
	TCOMPETE	-3.8	3.0	-.2	-1.3	.20
5	(Constant)	30.0	9.8		3.1	.00
	TBENEVOL	3.7	2.0	.2	1.8	.07
	TINTEGRI	8.4	2.0	.4	4.1	.00
	TPREDICT	4.2	1.6	.3	2.6	.01
	TCOMPETE	-2.8	3.0	-.1	-1.0	.34
	LCOMPETE	-3.5	2.0	-.2	-1.8	.08

Dependent Variable: Single item measure of trust in section member

Table 29: Model Summary of Trust in Team Regression Analyses

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
4	.5	.23	.21	17.2	.01	1.7	1	122	.20
5	.5	.25	.22	17.1	.02	3.2	1	121	.08

4 Predictors: (Constant), TBENEVOL, TINTEGRI, TPREDICT, TCOMPETE
5 Predictors: (Constant), TBENEVOL, TINTEGRI, TPREDICT, TCOMPETE, LCOMPETE

Interestingly enough, when leader competence was entered, it accounted for a marginally significant proportion of unique variance, and the beta weight was negative ($\beta = -.2$, $p < .08$). This suggests that trust in one's team is highest when the perceived integrity and predictability of the team are high, and when trust in the team leader's competence (as measured by the scale) is low.

This finding, if replicated in future work, represents a compelling view of the relationship between trust in teams and trust in a leader and suggests that they are far from independent entities [10]. To the extent that a team leader is seen as incompetent, trust within a team is actually higher. Moreover, these analyses also suggest that benevolence is only marginally important, predictability is somewhat important, and that integrity can be described as the most consistent force driving judgements of trust within teams.

Similar analyses were also completed with single item measure of trust in leader as the dependent variable, and different combinations of the trust in leader subscale items. The full set of analyses is shown in Tables 30 and 31 below.

Table 30: Coefficient Summary of Trust in Leader Regression Analyses

[10] There are, however, several reasons to be cautious about this finding. Because of the difference in available N's, adding the leader competence as the independent variable lessens the N available for the rest of the analysis.

Model		Unstandardized Coefficients (B)	Std. Error	Standardized Beta Coefficients	t	Sig.
1	(Constant)	50.7	8.5		5.9	.00
	LINTEGRI	4.4	1.9	.2	2.3	.02
2	(Constant)	36.4	10.7		3.4	.00
	LINTEGRI	3.4	1.9	.2	1.8	.08
	LBENEVOL	4.4	2.0	.2	2.2	.03
3	(Constant)	19.3	11.8		1.6	.10
	LINTEGRI	1.2	2.0	.1	.6	.54
	LBENEVOL	2.4	2.1	.1	1.1	.26
	LPREDICT	7.8	2.6	.3	3.0	.00
4	(Constant)	6.7	12.9		.5	.61
	LINTEGRI	-1.6	2.3	-.1	-.7	.50
	LBENEVOL	-1.4	2.7	-.1	-.5	.60
	LPREDICT	8.9	2.6	.3	3.4	.00
	LCOMPETE	8.4	3.8	.3	2.2	.03
5	(Constant)	-11.0	14.0		-.8	.43
	LINTEGRI	-2.9	2.3	-.1	-1.2	.21
	LBENEVOL	1.6	2.8	.1	.6	.56
	LPREDICT	6.2	2.7	.2	2.3	.02
	LCOMPETE	3.8	4.0	.1	.9	.35
	TCOMPETE	9.4	3.2	.3	2.9	.01

Dependent Variable: Single item measure of trust in section commander

Table 31: Model Summary of Trust in Leader Regression Analyses

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.20	.04	.03	28.2	.04	5.5	1	128	.02
2	.28	.08	.06	27.8	.03	4.7	1	127	.03
3	.37	.14	.12	27.0	.06	9.2	1	126	.00
4	.41	.17	.15	26.5	.03	5.0	1	125	.03
5	.47	.22	.19	25.8	.05	8.3	1	124	.01

a Predictors: (Constant), LINTEGRI

b Predictors: (Constant), LINTEGRI, LBENEVOL

c Predictors: (Constant), LINTEGRI, LBENEVOL, LPREDICT

d Predictors: (Constant), LINTEGRI, LBENEVOL, LPREDICT, LCOMPETE

e Predictors: (Constant), LINTEGRI, LBENEVOL, LPREDICT, LCOMPETE, TCOMPETE

Integrity was added first, and explained a significant amount of the variance in the single item measure of trust. In turn, benevolence was added. Once benevolence was added, the effect of integrity was marginal. Once predictability was added, however, integrity and benevolence no longer contributed significant variance to the model, although predictability was highly significant. In model 4, when the leader competence subscale indices was added, both predictability and leader competence accounted for a significant amount of the variance in trust in leader. That is, the more predictable and competent the leader, the more trustworthy the leader was seen to be. Based on the findings in the previous analysis, we also entered team competence into the final model. Team competence accounted for a significant amount of the variance, and knocked out leader competence

as having a significant impact. In the final model, with all 4 leader subscales and the team competence subscale added, only leader predictability and team competence account for a significant amount of unique variance in the single item ratings of trust in a team leader. The fact that the beta weights for leader predictability (ß = .2) and team competence are positive (ß = .3) suggests that the more predictable the leader and the more competent the team, the more trustworthy the team leader is seen to be. This finding is critical, as it suggests that the determinants of trust within a team and in a leader are different. To the extent that a leader is seen as incompetent, one's team is seen as more trusted. But, when a team is seen to be highly competent, a leader is more rather than less trusted.

Interestingly, two of the participants' comments spoke specifically to the issue of the relationship between trust in teams and leaders. One section member wrote:

> *... as a team we are very motivated and hard working. That is why we are in the section we are, but, our leader is not. He slipped through the cracks so to speak. He leads a group that is effective not because of anything that he does, but, because we do our jobs well despite him. Just to clear things up and give you a different angle to think about....the team is good and manages to cover up the fact that our leader is not.*

Another participant makes a similar point, in noting that the questionnaires should have included questions related to the perceived effectiveness of the team leader:

> *This survey never really asks if the leader is useful or not. A group can be very effective if individually motivated even if the actual leader is useless. Without somehow addressing if the group is actually compensating for ineffective leadership it may appear that untrustworthy, under-skilled leaders lead to skilled and motivated soldiers.*
>
> *One might consider it is easier to overshadow a poor leader in a tight knit group with only one weak link than in a larger more ineffective unit. The overall motivation of the "underlings" can make a garbage leader appear to shine.*

Although not specifically addressing the issue of trust, these comments seem to support the assertion that trust in the leader is dependent to some extent on the team's abilities to make the leader look good.

3.4.3 Propensity to Trust vs. Trust in General

As the propensity to trust construct is typically seen as a general disposition toward trust in other people, it should be related to the degree of trust for other people in general, as measured in our single item. Importantly, as the correlation matrix in Table 24 suggests, the highest correlation between the propensity to trust items and any other measured items was with the "degree of trust in general" item, with $r = .42$, $p < .01$ ($N = 181$). This provides some evidence that the propensity to trust items, as written, actually tap the extent to which a person has a trusting attitude toward others.

It is also important to note, as expected, there is a significant relationship between the propensity to trust, and the scale rating of the team's trustworthiness ($r = .34$, $p < .01$). Perhaps not surprisingly, there is a much smaller relationship between propensity to trust and the scale rating of leader trust ($r = .15$, $p > .05$). Trust in a leader as a single person about which one has direct and personal knowledge is likely to be somewhat more removed from one's overall propensity to trust than even one's trust in a team. Moreover, the propensity to trust measure is significantly correlated with the

single item measure of trust in one's team ($r = .18$, $p<.05$), but a considerable amount of the variance in this single item measure of trust is also left unexplained by propensity to trust. Again, however, the propensity to trust scale is not significantly correlated with the single item measure of trust in one's team leader. This suggests that trust in one's team is perhaps a different entity than trust in the leader, and requires a style that is more in keeping with one's general approach toward others. Trust in a leader, on the other hand, appears to be more distinctive and may or may not be related to one's general propensity to trust others.

Lastly, we wondered about the extent to which participants' rating on the trust scales could be explained simply by them being more trusting people, or being more positively inclined to see trust as an important concept. To explore this idea, we conducted another analyses looking at the relationship between trust subscale indices and the single item measure of trust, while controlling for propensity to trust and perceived trust importance. A regression analysis with the single item measure of trust in teams as the dependent variable, and the trust scale measure as the independent variable was conducted with propensity to trust and the importance of trust in team members as covariates. In the first step, only the covariates were entered. They explained only 5% of the variance in the single item measure of team trust. Then, the trust scale measure was added. At this point, only the trust scale accounted for a significant amount of the variance in the single item measure of team trust, and the R^2 change was also significant, with the model as a whole accounting for 29% of the variance in the single item measure of trust. Similar but somewhat weaker results were evidenced for trust in leader analyses. These analyses suggest that the trust measures capture something beyond propensity to trust in general, and that even the importance that individuals ascribe to trust do not significantly explain their ratings of trust in their teammates and leaders.

3.5 Discussion

In general, results showed that the first versions of the trust in teams scale and the trust in leader scales worked relatively well despite some obvious problems. The factor structure is relatively simple, and the items load on the expected factors. Moreover, the factor solutions account for 58% of the variance in trust in teams, and 63% of the variance in trust in a leader. The factors that underlie trust in these two contexts (i.e. predictability, integrity and benevolence) are similar, and match well with our developing model of trust in teams, and with the theoretical descriptions of trust noted in both the literature. Integrity appeared to be the most important dimension within teams, and predictability was the most important dimension in assessing the trustworthiness of a leader. Certainly, the items that capture these dimensions best within the two domains are somewhat different, but the underlying dimensions are common.

There is also good evidence for the validity of the trust scales that we created from several perspectives. The items currently in the scale are fairly well correlated with the single item measures of trust in one's team and in one's team leader, accounting for 25% and 12% of the variance in each respectively. Even in the long run, however, we would expect a multiple item scale that taps the components of trust will be more useful than a single item scale. More valid results will likely be obtained by using component factors rather than asking directly about trust, as there is opportunity for strategic responding.

Although significantly correlated with these single item measures, however, it is also clear that a good deal of the variance in trust remains uncaptured. As we have argued that competence is a key

factor in trust judgements, this is unsurprising as the competence items were not used in these analyses. It will be important to work toward designing scale items that account for a higher amount of the overall variance in the next iteration of the scale. Perhaps the biggest issue with this first iteration of the scale was in the competence items, which failed to form a discrete factor and were dispersed and loading on the other 3 factors.

Based on our review of the literature, competence is perhaps the most critical factor in small military teams. As such, failing to capture it adequately with this first iteration of scale is problematic, and it is important to understand why the items did not work. There are many possible explanations. As the correlation matrix shows, competence items were perhaps too closely related to integrity, predictability and benevolence. Indeed, with a relatively good proportion of the variance being accounted for by predictability, integrity and benevolence, competence has only some room to take over variance. It may be the case, then, that judgements about the competence of other teammates is integral to trust judgements, but that these are not necessarily distinct from issues of predictability, integrity and benevolence. Indeed, it may be difficult to imagine many ways in which one could be positively predictable without being competent in some sense. This suggests that competence may be implicated items actually intended to relate to benevolence, integrity and predicatability. It may be important, then, to develop items that more tap more discrete and specific forms of competence.

It also seems possible that the competence items did not hit the level of specificity needed to be distinct from other items. In order to make the scale maximally generalizable to other domains, specific traits and embedded scenarios that may have enabled participants to express the importance of competence (e.g. in terms of specific military tasks etc.) were not used. The relatively generic nature of the competence items may have been a problem. Rating the competence of one's team is a more reflective and non-specific task than rating it in a specific context and setting. This lack of specificity may lead people to rate at a higher level of abstraction than may happen in real life.

At a more global level, it is also plausible that competence is such an important trait within the military domain that it is most difficult to separate it from trust judgments. Perhaps within this domain, competence and trust are inseparable. Ultimately, of course, these questions need to be answered empirically. In the meantime, both conceptual and pragmatic decisions need to be made about what to do about the competence items.

The analyses showing that perceived leader competence also impacts negatively on the relationship between the single item measure of trust and scale measure of trust in a team, and that team competence impacts positively on trust in a leader are very intriguing and worthy of further consideration. Although it is often necessary to talk about trust as having a unidimensional and unidirectional quality, it is important to continually cultivate a multidimensional and multidetermined view of trust. Indeed, within the kind of military teams that we have explored to this point (e.g. where the leader is a member of the team), it may literally be impossible to disentangle our views of trust in the team from trust in the leader. This finding is potentially an important one, and one that finds support in both the existing literature, and in the focus groups that we conducted.

Just as importantly, the scale also behaves as expected with respect to other variables of interest. Although significantly correlated with propensity to trust, for example, the scale measures of trust in teams and leaders are both distinct from this generalized propensity to trust other people and perceived trust importance. This suggests that what our scale does capture trust in specific others.

Moreover, even the new simple measure of propensity to trust is significantly correlated with general trust in others.

3.6 Limitations and Caveats

It is important to acknowledge a number of limitations of our current work that will need to be addressed as our validation efforts continue. First, the sample of participants available for this initial study proved to be somewhat less homogeneous than we would have hoped. As mentioned earlier, we ideally hoped that participants would have been only either current members of infantry sections or current leaders of these sections. Despite exceptional cooperation from the regiment, and in part, because of the high number of participants needed, this narrow requirement could not be met. Participants proved to be a much more mixed set representing not only infantry section members and leaders, but participants from other positions within the battalion, including, for example, signallers and people from support companies. As noted earlier, the vast majority of participants did indicate current or recent experience as a member of a small team within the military context that they performed their duties, and presumably used this experience as their referent in completing the questionnaires.

Another challenge for this work (and likely for all future work) is the conceptual requirement for the highest possible level of stability and coherence within teams. As the growth of trust is predicated on the progressive development of trust-related expectations and feelings, when studying trust within teams, it is ideal to have team members with as much history and experience as possible. It is clear from this work that this is perhaps not a realistic expectation within the infantry context. This fact is likely to have had some impact during the current effort, as some of the scale items presume a relatively high level of experience, familiarity, and even connection with the other members of one's team. Constant turnover within teams makes developing these kinds of relationships very difficult as reflected in the following comments:

> *A lot of the questions in this questionnaire are difficult to answer because of the time we spend in small units. I have only been employed in my present position for a short time, so therefore I do not know the people in my section very well, and they do not have much experience. Developing trust takes time and we often do not have this luxury.*
>
> *I agree that I trust my section fairly well, but due to changing sections on a weekly basis due to Ottawa's brass bullshit, trust is not as good as it could be. If sections were kept together longer, they would work better together.*
>
> *It is hard to judge these questions. We change sections so often.*
>
> *In the infantry, unless we are on tour your section does not stay together for more than a few weeks. Getting to know a soldier in general is virtually impossible, let alone how to gauge how they will react in certain situations. The same for soldiers regarding their leaders.*
>
> *With our line of work (infantry) we need a lot of trust, especially when handling live rounds. We have a lot of leaders that come and go. The problem is by the time you start to trust someone they're gone. Then you start all over again and so on.*
>
> *The only way one gains trust of others, and begins to trust in others is by staying in teams for a long time to allow trust to build through experience*

These comments suggest that it will be important as the validation effort proceeds to represent a continuum of relationships within the team context, ranging from relatively instrumental contact with other teammates to more highly developed and invested relationships.

Importantly, we have argued at length that the role of context has been (at the very least) underemphasized in previous trust research and theory (Adams and Webb, 2003). In our focus groups with members of armoured reconnaissance crews, it was also clear that some contexts provide a much better basis for judging the trustworthiness of other team members than others. This theme re-emerged in this study in comments from members of infantry sections:

> *I think there are different types of trust in military situations; combat, personal, garrison. At all times you must always feel concern and have section integrity and competence. But during combat, belief in your section's competence, concern for your troops and predictability push themselves up to the top. Having those attributes are what makes a unit work like a machine.*

It was gratifying to see this idea clearly expressed by the members of small infantry teams that participated in this research. Again, it suggests that the ideal way to study trust in small military teams is to understand teams that have the opportunity to work and to interact within a full range of contexts.

Another possible limitation of the scale items as written is that many of them were directed at high risk, high stress situations. Although one would expect infantry teams to have had the potential to experience these kinds of situations, the relative instability in current infantry teams in garrison makes these kinds of experiences relatively rare in the Canadian Forces. This may have limited participants' ability to complete some of the scale items meaningfully.

> *You ask questions about high risk situations, well half of us have never been in one. You ask about our leaders, we have many. Some I would follow into battle, some I wouldn't want to follow to Tim Hortons. I believe trust comes from experience give me this survey again after I have worked with my teammates under stress. I will be able to answer these questions better.*

> *Trust in our job is hard to assess, why? We don't work long enough together to develop such trust. Leaders don't gain any trust because they don't take care of their people. Trust can only be evaluated when bullets start to fly.*

> *We have not spent enough time together as a unit in order for us to predict what each other will do. We as well, have not been in a stressful or riskful situation, therefore there is no way to answer most of these questions accurately.*

As our validation efforts proceed, it will be important to represent the full scope of situations (including both high and low risk) faced by infantry teams. As we would argue that trust relies on expectations about what might happen (as well as what people have actually experienced), this concern can be addressed by making some of the scale items more conditional so as not to rely on actual experiences, but on hypothetical projections of what they would expect should they encounter high risk and high stress situations with the other members of their teams.

Lastly, it is critical to note that although our current efforts focus on trust solely at the level of teams, it is inevitable that other influences will also play a role in perceptions of one's teammates and leader. In fact, several participants reminded us of the potential for systemic issues to impact

on trust in teams and in team leaders. The participants in our research strongly advised us to look beyond trust at the small team level (e.g. infantry section).

> *Work related goals are dictated in orders under operational environment. You want to talk about trust, you should be talking about faith in our leadership and not at section level those problems get sorted out and to a certain extent at PL level as well. Ask me if I have faith in or trust anyone at NDMC or above the rank of MWO, or CAPT or any of the 2 faced politicians that are our bosses.*
>
> *Competence and integrity are the most important factors that I am concerned about. Currently, there is concern about level of competence of senior leadership in the CF and lack of integrity at even higher levels including general staff and politicians. Survey should be geared towards a study of confidence we have toward senior leadership – master warrant and above to general staff. This is where the real problems lie. There is no trust of the higher levels of command due to poor decision making and command policies that make no sense to the troops. As a senior NCO I am forced to enforce idiotic policies that make no sense to anyone but those who create them.*
>
> *Trust from my perspective is extremely important, especially in my job of reconnaissance because we operate in small team well forward of friendly troops. For that reason I place a high value in absolute competence and integrity so I am confident that the other members of my detachment are doing their job effectively. Unfortunately, the government and the Canadian Forces have all but obliterated the possibility of creating that kind of trust environment. Our higher leadership maintains a "holier than thou" attitude and the lack of trust starts right form the top. In that regard, the level of trust is not so much of a problem amongst lower ranks, but of the lower ranks not trusting those high up.*
>
> *Trust goes much higher than the section commander. The junior soldier lacks trust, confidence etc. in the higher levels of the military. Because of lower standards to get into the military, lack of support from the government, and rewarding incompetent soldiers with career courses, trust in "the system" is sliding fast. The high ranks are losing touch with the soldiers. The military is not a business, and should not be run like one. Trust is the foundation of what we do. Once trust in "the system" is lost, it may be too hard to get back.*

This suggests that, as important as it is to consider trust at the small team level, it is critical to remember that issues of trust are likely to influence both expectations and behaviour at both lateral and vertical levels. As we have argued, it is important to stay continually attentive to these systemic issues of trust that are likely to exert influence.

Despite these limitations, however, a number of conclusions can be made from these analyses, in terms of revisions necessary to undertake for the next stage. These opportunities for the way ahead are described in the final section.

3.7 Revisions to Explicit Measures

The following revisions to the trust in team and trust in leader scales will need to be undertaken. These include:

- Extensive reworking of the competence subscales – As the most influential factor influencing trust in teams, it is critical to capture the dimension of competence more distinctly. This will be accomplished by a thorough review of the competence items used

in the first iteration of the scale. As we noted earlier, there are several possible interpretations of why the competence items did not work. It is importance to be able to distinguish competence from trust in general, and from the other dimensions of benevolence, integrity and predictability. This need for a more specific conceptualisation of competence, however, raises a potential challenge for how to do this without compromising on the ability of the scale to be extended in domains outside of the military context. This will be examined in detail and efforts to find the best possible balance will be ongoing through our validation efforts.

- Review the final scale items in order to address a range of relationships with varying depth, and which are applicable to both high risk and low risk settings – One of the problems noted in the focus groups was that many of the scale items pull for relationships with high levels of interdependence and familiarity. In order to capture team relationships with a broader range of familiarity, it will be important to alter the scales to provide a better balance between high and low familiarity relationships.

  Other feedback from participants indicated that many of them had not been part of teams operating in highly stressful and risky environments. Yet, several of the scale items pull for high risk and stress. We will need to revisit these items in order to ensure that there is a balance in the items to reflect a range of team experience.

Based on conclusions made from the analyses described in the previous section, it is recommended that future work concentrate on improvement and validation of the trust in teams and trust in leaders scales. The proposed scales, of course, will also be subject to the same concerns and constraints of all other self report measures, and extensive testing of the reliability and the validity of this measure will need to be undertaken in order to be confident about the value of the scales we create.

THIS PAGE INTENTIONALLY LEFT BLANK

4. Implicit Measures of Trust in Teams

This chapter explores the conceptual underpinnings of implicit measures of trust in teams and describes the results of a pilot study exploring this issue.

4.1 Rationale for Use of Implicit Measures

To this point, our efforts to measure trust in teams have focused on creating explicit measures of trust in teams, and in team leaders. These measures require that people reflect on their beliefs, attitudes and expectations about other team members, and accurately self report them. Psychology researchers have long noted that in many situations, self-report measures are problematic, as they are based on the broad assumptions that people:

- Have introspective abilities
- Are capable of reporting their perceptions
- Are willing to report both positive and negative attitudes

These assumptions have been challenged on a number of levels. A wide body of work, for example, has argued that people are not necessarily in tune with their true feelings about objects in a variety of areas (Nisbett & Wilson, 1977). Self-report measures can also be subject to social desirability concerns. When it is clear what the socially desirable response is in a given situation, people may be motivated to conform to social standards. There is also a growing body of evidence that self-reported behaviours and attitudes are also prone to being influenced even by features of the research instrument, including the wording of questions, by the question format and by the context in which the question is encountered (Schwarz, 1999). The extent to which these potential problems threaten the validity of self-report measures, of course, depends very much on the kind of the judgements that need to be made.

In general, we would argue that in measuring trust within teams, there is some reason to be concerned about the validity of self-report measures. First, because of social norms around trust, people may find it difficult to report their true trust attitudes toward others. As Bigley & Pearce (1998) have argued, within our society, trust is typically valued as being good, and distrust as bad. If an individual is motivated to adhere to social norms, the "correct" response from a normative perspective may be to overestimate trust in one's teammate. If social desirability concerns drive ratings of one's trust in a team, it may be difficult to accurately assess trust using self-report measures.

Moreover, we would argue that these issues could be exacerbated in small military teams. Military combat teams work in close proximity and operate within a formal hierarchical power structure. As such, they may be unwilling to report particularly negative attitudes toward their fellow teammates. If these conditions cannot be altered so as to provide a safe environment in which to report one's true attitudes, then, the validity of explicit measures of trust in teams has the potential to be compromised.

As noted earlier, there are also obvious ethical issues associated with asking about issues of trust within teams, as this has at least the potential to make issues of trust (or distrust) more salient than might be optimal for the team. Directly asking individuals to both reflect on and to commit on

paper to their trust in other teammates has the potential to harm the dynamics of trust. Harming team dynamics has the potential to threaten team performance.

If, as some trust theorists argue (e.g. Jones & George, 1998), trust can be understood as a specific kind of attitude, it may be that some of the methods used in social psychological research in order to understand attitudes may be helpful in understanding trust as well. Implicit measures, for example, have been used in many different contexts to understand attitudes toward members of stereotyped groups (Fazio, Jackson, Dunton, & Williams, 1995; Wittenbrink, Judd, & Park, 1995; Devine, 1989). Within this context, implicit measures have been used primarily because they allow access to attitudes that would not otherwise be stated explicitly, and which do not provide direct feedback to participants about the content of their attitudes.

In this work, we explore implicit measures of trust in teams, as they may provide a higher level of protection against harming the dynamics of trust. Such measures do not require participants to rate trust in their team explicitly (avoiding ethical issues), do not provide direct feedback about the status of trust within a team, and also lessen the potential for consciously altering one's responses in order to meet social desirability goals. Although there is no evidence in the published literature that implicit measures of trust have been used to date, in light of the concerns around measuring trust in teams, implicit measures are a logical and important alternative to explore.

4.2 Understanding Implicit Measures of Attitude

It is important to ask first, what implicit measures are, and how they are purported to work. Implicit measures are also frequently called indirect measures.[11] In the recent "state of the art" paper reviewing implicit measures, Fazio & Olson (2003) make a distinction between implicit attitudes and implicit measures. Implicit attitudes are typically defined as attitudes about which people lack awareness. Fazio & Olsen (2003) argue that even when implicit measures are used, however, people are not necessarily unaware of their attitudes. With many implicit measures, people are simply not aware that their attitudes are being assessed. As such, the measure, not the attitude per say, is implicit.

Unfortunately, despite the prominent use of implicit measures, the theoretical underpinnings for these approaches have been somewhat lacking. Perhaps the best conceptual grounding for this approach lies in the MODE model developed by Fazio (1990). The MODE model (acronym stands for motivation and opportunity as determinants) is a dual process model which focuses on the processes by which attitudes come to influence judgement and behaviour. This model argues that attitudes can influence via one of two distinct processes -- i.e., through relatively deliberative or more spontaneous processes. First, attitudes can be influenced by the automatic activation upon merely encountering attitude objects. As such, people with a prior attitude toward an object (whether this attitude is conscious or not), may show automatic attitude activation. On the other hand, there are also cases in which a more deliberative process occurs, and people engage in more effortful processing about an object. The ability to engage in deliberative processing will be determined by the motivation of the individual, and by the opportunity to do so. The relationship between these two modes of processing, between deliberative processes (that might be tapped in

[11] It is important to acknowledge here that implicit measures are also called "indirect measures". In order to minimize confusion with the conceptual decision related to measuring trust indirectly (see Section 2.1.2), we have chosen to use the term implicit rather than indirect in this section.

explicit or self-report measures of trust) and spontaneous processes (that might be tapped with more implicit measures) is still openly debated in the research literature. From our perspective, it seems clear that understanding how to measure trust in teams from both these perspectives may have benefit in the longer term.

There are many different forms of implicit measures (for a full review, see Fazio and Olson, 2003). The methodology that we have chosen to use in this pilot study is the Implicit Association Test (IAT), as the most widely used and influential test of implicit attitudes (Greenberg, McGee and Schwartz, 1998). This test, a specialized reaction time task, is used to access attitudes indirectly. The IAT has been used in varying domains to understand implicit attitudes toward people of different races (Ashburn-Nardo, Voils, & Monteith, 2001) and toward oneself (DeHouwer, 2002; Greenwald & Farnham, 2000). This being said, it is also important to acknowledge that the research literature around the IAT is both positive and negative. For example, although there is good evidence showing that this test can be both valid and reliable (Greenwald & Nosek, 2001), there is also some evidence that its predictive validity is limited in some situations (Fazio & Olsen, 2003).

The strength of the IAT procedure is that it allows a simple test of the relative association between two related objects or concepts. In the IAT, participants are asked to categorize stimuli by pressing one of two keys in response to both a target stimuli (e.g. flower or insect) and an evaluative stimuli (e.g. positive or negative, pleasant or unpleasant). The premise of the IAT is that when one has a positive attitude toward the target stimuli, responses will be faster when the target stimuli is paired with positive concepts (e.g. happy, good) than with negative concepts. Similarly, a negative attitude toward the target stimuli would lead to faster responses when the target and negative concepts are paired (e.g. flower and bad) than when the target stimuli and a positive concept are paired (e.g. flower and good). Essentially, the IAT methodology can be used in order to understand the relationship any two stimuli, whether attitudes (e.g. the relationship between an object and attitudes toward it) or other psychological stimuli (e.g. the degree to which one's identity is associated with a particular concept).

4.3 Pilot Study Questions

The overall goal of this work, then, was to pilot the use of implicit measures of trust within small military teams, with respect to three primary questions:

Can trust in teams be captured using implicit measures? First, this work aims to explore whether implicit attitudes related to trust in teams can be captured using implicit measures. If it is possible to use implicit measures to access attitudes about one's teammates, this would be an invaluable tool in light of the issues inherent in the use of explicit self-report measures.

Do implicit measures have face validity? Secondly, a major concern is the extent to which this kind of methodology (independent of its actual usefulness) is seen to have face validity on the part of military participants. Although the task is simple on the surface, it is somewhat esoteric and even academic compared to self-report measures of trust in teams. As such, it may be dismissed by military personnel who, in our experience, have a greater need than university undergraduates to see the value of the studies that they participate in. If military participants cannot accept the intuitive value of this approach, then its actual effectiveness may be a somewhat less important question.

Are implicit measures correlated with explicit measures? Lastly, at a conceptual level, we are also interested in the extent to which explicit measures of attitudes are correlated with implicit measures of attitudes. As we expect that explicit measures of trust in teams may be subject to some of the limitations of self-reports, this relationship is not expected to be extremely high. On the other hand, we would expect that should be a modest relationship between these two kinds of measures. This study will work to understand the relationship between explicit and implicit measures of trust in teams.

In order to explore these preliminary questions, we conducted a pilot study exploring these issues. This study is described in more detail in the section that follows.

4.4 Method

This pilot study using implicit measures in order to explore trust in teams using was conducted on Oct. 28, 2002 at CFB Petawawa.

4.4.1 Participants

In total, 26 participants were administered both the implicit measures as well as the trust in team scale. Participants were active regular force members of 1 Royal Canadian Regiment (1 RCR). The minimum number of years of service was two 2 years and the maximum length of service was 5 years.

4.4.2 Procedure and Materials

Over the course of the day, each participant completed both implicit measures and explicit measures of trust in teams. Four of the 26 participants completed the implicit measures prior to completing the explicit measures, while the remaining 22 participants completed the explicit measures prior to the implicit measures. [12]

In general, the IAT involves a specific reaction time task in which participants are presented with a target word and another word stimulus and are asked to make a decision about whether or not the two words are associated. For a comprehensive description of the generic categorization tasks used in the IAT, refer to Greenwald et al. (1998).

In this work, we sought to explore the use of implicit techniques to understand the relationship between trust and the concept of a "team". Typical IATs require the creation of word sets that provide a target stimuli (in this case, "team"), and an opposing target stimuli (in this case, the logical opposite of a "team", concepts related to "individuals"). Similarly, the evaluative stimuli are also typically polar opposites, such as "positive" or "negative". In this case, the terms "trust" (and related concepts) and "distrust" (and related concepts) were used.[13] The logic of the IAT

[12] This order is not ideal, in the sense that priming effects from having completed the trust measures may have impacted on the IAT completion. At the same time, however, the opposite may also have been true. For this exploratory study, however, pragmatic scheduling requirements dictated this order.

[13] In our current review of the dimensionality of trust (Adams and Sartori, 2004), we argue that "trust" and "distrust" are actually two separate (but correlated) constructs. Nonetheless, in order to present the strongest possible test of our hypotheses, here, we follow the conventional conceptualisation of them as bipolar opposites.

argues that when concepts related to trust and team are simultaneously presented, people who trust their teammates should be faster when responding to word pairs linking trust concepts and team concepts than when responding to trust concepts and concepts related to individuals. This may be the case because the association between "trust" and "team" is simply more accessible than is the association between "trust" and "individual". As such, individuals who trust their teammates will be more likely to respond faster when the concepts of trust and team and the opposite constructs of distrust and individual are paired than when the constructs of trust and individual and distrust and team are paired.

In addition, we also took the opportunity to explore several other relationships relevant to the concept of trust. The IAT has also commonly been used to assess the relationship between target concepts and evaluative word sets depicting positive or negative attributes. Individuals' attitudes toward trust are also relevant. As noted earlier, we would expect that trust is typically seen as a relatively positive construct. This IAT explicitly tests this assumption by pairing the trust concept with evaluative words sets (shown in previous IAT research to have either positive (e.g. peace, freedom, lucky, honest) or negative (e.g. cancer, poison, pain) implications. This IAT, then, explores what might be called "trust attitudes". Obviously, participants with a more positive trust attitudes should show facilitated responses to trust-positive and distrust-negative word sets than to trust-negative and distrust-positive word sets.

An IAT exploring "team attitude" (and following similar logic to the "trust attitude" IAT) was also employed. This allowed exploration of the extent to which team concepts were associated with positively rather than negatively valenced words, and are an indirect indicator of the positivity of the "team" construct.

Lastly, another IAT sought to explore the relationship between participants' self-concept and the "team" concept. In essence, this IAT is an indirect indicator of participants' team identity. One would expect that higher levels of trust within a team would also be associated with a higher level of team identification. This IAT explores this issue specifically. Taken together, these additional IATs also provide participants with a range of different experiences in completing the IATs, and make the primary IAT of interest (namely, the team-trust IAT) less salient, and its purpose less obvious to participants.

All participants completed a total of four word-based Implicit Association Tests (IATs). The IATs explored the relationship between the concepts of "team" and "trust", attitudes toward trust and toward one's team, and identification with the team. A complete list of the word sets used for each of the four IATs is included in Annex A.

In the primary task, the implicit association between trust and team was explored. To the extent that these participants responded faster to trust items when paired with team-related rather than individual-rated words (and to trust rather than distrust), this might provide evidence of an implicit association between these concepts. This data was analysed in terms of the match between latencies associated with congruent or incongruent word sets, in accordance with established procedures.

The IAT was administered to each participant on one of four laptop computers. The IAT was programmed and executed using IAT software for Windows 2000, developed by Inquisit™. Participants were seated during the test and viewed the monitor from a distance at which they were comfortable. As participants performed each IAT, a software program (Inquisit) automatically recorded latency and error data.

Each IAT task included 5 blocks of practice trials (each with 20 trials), and 2 test blocks (each with 40 trials). As an example, the trial blocks used in the Team Trust IAT are presented in Table 32.

Table 32: Trial blocks used in the Team Trust IAT Task

Block(s)	Type of judgement	Left key	Right key
1	Team discrimination	Individual	Team
2	Trust discrimination	Distrust	Trust
3	Team trust compatible discrimination (practice)	Individual or distrust	Team or trust
4	Team trust compatible discrimination (trial)	Individual or distrust	Team or trust
5	Reversed team discrimination	Team	Individual
6	Team trust incompatible discrimination (practice)	Team or distrust	Individual or trust
7	Team trust incompatible discrimination (trial)	Team or distrust	Individual or trust

A 150 ms inter-trial interval was used. In between blocks, participants were given a self-paced break and instructions for the next block. Participants completed all four IAT tasks, presented in a random order, in a single session that took about 20 minutes. Participants had a brief rest between tests while the experimenter set up each subsequent IAT.

4.4.3 Data Reduction

In the process of administering the IAT's, it quickly became clear that our assumptions about the valence of some of the stimuli words were problematic. Most importantly, the pilot testing revealed that some of the underlying assumptions about the positivity of certain words did not hold within a small team military environment. More specifically, even while they completed the IAT's, participants argued that the five words presented below had very different implications within a small team military context. Table 33 lists our assumptions about the presumed valence of each word versus the actual valence in the perception of military participants.

Table 33: Trials excluded from IAT data analysis

Word	Presumed Valence and Rationale	Actual Valence and Rationale
Vigilance	Assumed to be associated with distrust – one might be more likely to be vigilant if another person was seen to be less than trustworthy	Actually more likely to be associated with trust, as a lack of vigilance on the part of a fellow teammate could be fatal
Suspicion	Assumed to be associated with distrust – one might be more likely to be suspicious if another person was seen to be less than trustworthy	Actually more likely to be associated with trust, as a lack of suspicion on the part of a fellow teammate could be fatal
Suspicious	Same as suspicion	Same as suspicion

Predictable	Assumed to be associated with trust – one might see another as trustworthy if he/she is predictable	Actually more likely to be associated with distrust, as predictability could be fatal
Unpredictable	Assumed to be associated with distrust – one might see another as less than trustworthy if he/she is unpredictable	Actually more likely to be associated with trust, as predictability could be fatal

As a result, latencies of all trials associated with these words were removed from the data set and are therefore not included in any subsequent data analysis. In addition, trials with true errors were also excluded from subsequent analysis. The error rate in the Team Trust IAT was 6.9% of all trials.

IAT effect scores were computed using the generic IAT scoring algorithm (Greenwald et al., 1998) that compares the mean response latency of trials in Block 4 to Block 7. In keeping with Greenwald et al. (1998), the first trial of each block was eliminated, extreme latencies were recoded such that those greater than 3000 ms were scored as 3000 ms and those less than 300 ms were scored as 300 ms, and error trials were noted (but retained in the calculation of the IAT effect). The mean response latency for the team trust compatible block was subtracted from the mean response latency for the team trust incompatible block trials. Therefore, larger positive IAT effect scores reflect a stronger association between team and trust compared to individual and trust or team and distrust.

4.5 Results

4.5.1 Descriptive Analyses

The descriptive statistics for the Team Trust, Team Attitude, Trust Attitude and Team Identity IAT effect scores are shown in Table 34.

Table 34: Descriptive stats for Team Trust IAT scores (all units in ms)

IAT	Mean (StDev)
Team Trust	313.8 ± 317.3
Trust Attitude	634.1 ± 459.7
Team Attitude	116.2 ± 228.1
Team Identity	-288.3 ± 274.4

Most critically, the mean IAT effects for Team Trust reported in Table 34 indicate that participants responded faster when the elements team-trust and individual-distrust were paired than when individual-trust and team–distrust were paired. As a whole, then, this finding suggests that members of military teams did show the expected IAT effect on the team–trust dimension, and this finding was relatively robust.

For the trust attitude IAT, we expected that participants would endorse trust as a positive concept. Participants' responses on the trust-positive and distrust–negative word sets were considerably faster than were responses to trust-negative and distrust–positive. The overall mean of responses showed a very strong IAT effect that supports the assertion that trust is seen as a positive concept. This IAT provides support that the methodology did perform as expected.

The team attitude IAT results also showed the expected positive IAT effect. Participants were faster when the elements team-positive and individual-negative were paired than when individual-positive and team-negative were paired. This suggests that the concept of team was more strongly linked with positive than negative concepts.

The negative mean IAT effect for team identity indicates that, contrary to our prediction, participants responded faster when the elements self-individual and other-team were paired than when the elements self-team and other-individual were paired. This suggests that participants did not identify themselves with their team more than as individuals. This is clearly different from what was expected. There are a couple of plausible explanations for this finding. First, it may be the case that the word sets as constructed may have failed to capture the unique quality of team identity. Although intended to assess the extent to which "self" words are linked with "team" words, the fact that the team words are generic rather than specific to one's specific team may have lessened this association, and limited the extent to which participants actually identified with their team. As such, although the previous IAT suggests that participants saw the team concept as a positive one, the word sets may not have primed a specific team identity. The distinction between team and individual may have been the source of the problem. It may be that the correct distinction would be between one's specific team and other possible teams, rather than the team-individual distinction employed here.

It is worth noting here that the standard deviations are quite high. This finding may be related to the valence problems with some of the words noted earlier. As mentioned, trials involving all of these words were eliminated in all of the reported analyses, so this could not explain the large variance in speed of responding. It may be the case, however, that this word valence problem caused some participants to pause in responding to all words more than would otherwise be the case. Other

participants may have been relatively unaffected. This, of course, is speculative, but this issue will need to be addressed in future work.

4.5.2 Correlational Analysis

Another goal of this work was to explore the relationship between the measures taken with the Implicit Association Test and the explicit measures of trust in teams (e.g. the trust scales etc.). In order to explore the relationship between the explicit and implicit measures of trust in teams, the IAT effect for Team Trust IAT was correlated with the mean score from the team trust scale, an explicit measure of team trust. The correlation between the team trust IAT and the explicit scale measure of team trust was low, positive and not significant ($r=.17$, $p>.05$). It is important to note, however, that the sample size used in this study was necessarily low.

4.5.3 Focus Group Feedback

In addition, we also talked directly to participants about their experiences in completing the implicit measures, in order to get a sense of their experiences in completing the tasks and their acceptance (implicit and explicit) of this kind of methodology. As the explanation of the underlying basis of the IAT is somewhat academic and not immediately obvious, we expected that participants may express some cynicism (or would be at least somewhat sceptical) about the measure. In general, although interested in the methodology, participants did not express the scepticism that we expected, and were generally positive about their experiences in completing the IAT's. Participants seemed happy to complete the tasks, and showed consistent motivation to do so. In our view, participants' positive attitude toward the IAT tasks represented more than simple acquiescence, as they seemed actively engaged and interested in what the measures were intended to tap during the debriefing stage. This suggests that acceptance of implicit measures was very encouraging, and they did seem to have face validity.

4.6 Discussion

As a result of this pilot study, it is now possible to consider the initial 3 questions addressed by this pilot study.

Can trust in teams be captured using implicit measures? Importantly, there is some evidence that trust within teams can be meaningfully captured using implicit measures. The trust attitude IAT also performed very well, as did the team attitude IATs. The IAT related to team identity, on the other hand, did not perform as expected. We would argue that the word lists for this task may have problematic, and future work needs to be directed toward exploring this more if this dimension is to be measured. Taken together, however, the apparent success of our exploratory efforts to use implicit measures of trust is very encouraging. It will be important to explore this issue in more detail in future work.

Moreover, in order to adequately answer the questions about the value of implicit measures in understanding trust in teams, it will also be important to consider other implicit measures such as sentence completion etc. As the future of IAT methodology has progressed, it has become increasingly clear that there are situations in which the IAT methodology may not be capturing exactly what it is intended to capture (Fazio & Olsen, 2003).

Do implicit measures have face validity? It seems clear, that at least with this limited sample, this kind of measure does seem to be accepted at face value as a valid tool. The fact that these measures are accepted by military participants is an important finding.

Are implicit measures correlated with explicit measures? Results of this study show a very low correlation between measures of trust in teams on explicit scales and between implicit measures. There has been great variance in reported correlations between the IAT and related explicit measures. Within the literature, there is sometimes an assumption that explicit and implicit measures will be highly correlated to the extent that response bias can be minimized. Gawronski (2002) makes reference to an ad hoc meta-analysis of recent research revealing a mean correlation of r=.22 (SD=.17) with correlations ranging from -.18 to .68 (N=180). With a correlation of r = .17 in our work, this suggests that the correlation, although small, is not necessarily atypical.

There may be several explanations for the low and non-significant correlation between implicit and explicit measures of team trust. First, it may suggest that IAT and self-report measures assess different constructs. As noted by Greenwald et al. (1998), "it has been argued that implicit and explicit measures of attitudes tap into different knowledge and thus would be unrelated". Second, as noted earlier, assessment of trust in teams may be subject to social desirability concerns, which would presumably affect explicit measures but not implicit measures. This is consistent with the suggestion made by Greenwald et al. (1998) that "the IAT may be more resistant to self-presentational factors than are the explicit measures." On the other hand, implicit research and theory also argues that there are conditions under which these two kinds of judgements may be very different, and that they may stem from very different and perhaps even somewhat different psychological processes.

One way to address this issue would be to use a known-groups paradigm. It seems reasonable to assume that varying levels of power within relationships may impact on participants' ability to report trust in other teammates accurately, and this is particularly true for participants with relatively low levels of power. Taking low vs. high power relationships (e.g. hierarchical relationships where the follower is rating a leader) allow exploration of these trust issues, and of the relationship between implicit and explicit measures. In low power relationships, one would expect a high correlation between implicit and explicit attitudes of trust because social desirability and/or fear of repercussions may not play a role. Within high power relationships, on the other hand, there may be less of a correlation between explicit and implicit because explicit measures may be subject to social desirability concerns.

4.7 Limitations and Caveats

Despite the promise of implicit measures for exploring trust within small military teams, it is important to acknowledge that this methodology presents very practical challenges. The process of setup and analyses of the implicit measures is considerably more than administering scale questionnaires. The logistics of running a large number of participants through a test of implicit trust attitudes are fairly substantial. This is not to say that this is not worth doing. In fact, we would argue that understanding trust in teams from both an explicit and implicit perspective may hold great promise in terms of cross validation of measures using varying methodologies. The cost of using implicit measures, however, should not be underestimated. To perform this work in the field requires multiple laptop computers, some power source or ability to recharge, and reliable

data backup systems. As such, it is important to consider these issues in weighing priorities for future work.

4.8 Revisions to Implicit Measures

The following revisions will be necessary for future work to occur:

- The initial pilot study of implicit measures indicated a number of problems with the underlying valence of some of the words in the word sets. Whatever the changes to stimuli or word sets, it will be important to pretest these word sets and stimuli to ensure that assumptions about valence are correct.
- Consider other stimuli and/or word sets. It is difficult to know with certainty the extent to which participants' attitudes toward their own teams can be distinguished from the positivity of their views about specific teams. Although these are unlikely to be widely dissimilar, there may be methodologies that would circumvent this potential future criticism. One of the ways to do this, for example, would be to use pictures of one's actual teammates as the priming stimuli, and word sets related to trust/distrust as the secondary prime. The results from a study like this may be somewhat more certain to be tapping trust in one's own team vs. trust for teams in general. The other possible methodology would be employ a known-group methodology, and to take teams whose levels of trust are both high and low (as indicated on explicit measures), and to administer the team trust IAT. Finding a difference in IAT scores between high and low trust teams would suggest that the team trust IAT is measuring what it is intended to measure.
- For future work, it may be helpful to employ a variety of implicit measures. The recent review by Fazio and Olsen (2003) discusses a range of other measures, and these have been validated to varying degrees. As the IAT has been both shown to have considerable value (Gawronski, 2002), and to be subject to several limitations (e.g. Karpinski and Hilton, 2001), it will be important to consider the limitations that may exist within the context of trust in teams, and to find ways to work around these potential problems. This will require not being fixed on only one methodology, but to consider a range of implicit measures that may enable us to approach trust in teams from many several different perspectives. Other implicit measures may include word or sentence completion tasks and even physiological approaches that have employed to understand other kinds of attitudes. These approaches offer innovative ways to think about measuring trust in teams.

THIS PAGE INTENTIONALLY LEFT BLANK

5. References

ADAMS, B.D. and SARTORI, J. (2004). Dimensionality of Trust in Teams. Draft report to Department of National Defence.

ADAMS, B.D., BRYANT, D.J. and WEBB, R.D.G. (2001). Trust in teams: Literature review. Report to Department of National Defence. DRDC Toronto Report CR-2001-042.

ADAMS, B.D. and WEBB, R.D.G. (2003). Model of trust development in small military teams. Report to Department of National Defence. DRDC Toronto Report CR-2003-016.

ASHBURN-NARDO, L. VOILS, C., and MONTEITH, M. (2001). Implicit associations as the seeds of intergroup bias: How easily do they take root? Journal of Personality & Social Psychology, 81(5), 789-799.

BIGLEY, G., and PEARCE, J. (1998). Straining for shared meaning in organization science: Problems of trust and distrust. Academy of Management Review, 23(3), 405-421.

BROWER, H. H., SCHOORMAN, F. D. and TAN, H. (2000). A Model of Relational Leadership: The Integration of Trust and Leader-Member Exchange. Leadership Quarterly 11(2): 227-250.

BUTLER., J. K. (1991). Toward understanding and measuring conditions of trust: evolution of a conditions of trust inventory. Journal of Management, 17(3), 643-663.

COOK, J. and T. WALL (1980). New work attitude measures of trust, organizational commitment and personal need non-fulfilment. Journal of Occupational Psychology, 53, 39-52.

COSTA, A. C., ROE, R., and THAILLEAU, T. (2001). Trust Within Teams: The Relation With Performance Effectiveness, European Journal of Work and Organizational Psychology 10(3): 225-244.

COUCH, L. L., ADAMS. J., and JONES, W. (1996). The assessment of trust orientation. Journal of Personality Assessment, 67(2): 305-323.

COUCH, L. L. and JONES, W. (1997). Measuring levels of trust. Journal of Research in Psychology, 31, 319-336.

COX, A. (1996). Unit cohesion and morale in combat: Survival in a culturally and racially heterogeneous environment. United States Army Command and General Staff College, Fort Leavenworth College.

CUMMINGS, L. L. and BROMILEY, P. (1996). The Organizational Trust Inventory (OTI): Development and Validation. Trust in Organizations: Frontiers of Theory and Research. T. R. T. R.M. Kramer, et al. Thousand Oaks, CA, Sage Publications, Inc.: 302-330.

DELUGA, R. (1995). The relation between trust in the supervisor and subordinate organizational citizenship behavior. Military Psychology, 7(1), 1-16.

DEPARTMENT OF NATIONAL DEFENCE (1996), *B-GL-300-003/FP-000 Land Force Command*, Ottawa: DND, Canada.

DEHOUWER, J. (2002). A structural analysis of indirect measures of attitudes. In Musch, J., Klauer, K.C. (eds.). The Psychology of Evaluation: Affective processes in Cognition and Emotion. Mahwah, NJ: Erlbaum.

DEVINE, P. (1989). Stereotypes and prejudice: Their automatic and controlled components. Journal of Personality and Social Psychology, 56(1), 5-18.

DIRKS, K. T. (1999). The effects of interpersonal trust on work group performance. Journal of Applied Psychology 84(3), 445-455.

DIRKS, K. T. (2000). Trust in leadership and team performance: evidence from NCAA basketball. Journal of Applied Psychology, 85(6), 1004-1012.

DOBREVA-MARTINOVA, T. (2001). Confidence in leadership: Replication of Murphy and Farley's exploratory analysis of the unit climate profile. DRDC Toronto Report CR-2001-149.

FAZIO, R. and OLSON, M. (2003). Implicit measures in social cognition research: Their meaning and uses. Annual Review of Psychology, 54, 297-327.

FAZIO, R., JACKSON, J, DUNTON, B. and WILLIAMS, C. (1995). Variability in automatic attitude activation as an unobtrusive measure of racial attitude: A bona fide pipeline? Journal of Personality and Social Psychology, 69, 1013 – 1027.

FAZIO, R. (1990). Multiple processes by which attitudes guide behavior: the MODE model as an integrative framework. In Hendrick, C., Clark, M. (Eds.). Review of personality and social psychology, Vol. 11. Thousand Oaks, CA, US: Sage Publications, Inc.

GAWRONSKI, B. (2002). What does the Implicit Association Test measure? A test of the convergent and discriminant validity of prejudice-related IATs. Experimental Psychology, 49(3), 171-180

GREENWALD, A. G., MCGEE, D. E. and SCHWARTZ, J. L. (1998). Measuring individual differences in implicit cognition: The implicit association test. Journal of Personality and Social Psychology, 74(6), 1464 – 1480.

GREENWALD, A. G. and FARNHAM, S.D. (2000). Using the implicit association test to measure self-esteem and self-concept. *Journal of Personality and Social Psychology*, 79(6), 1022-1038.

GREENWALD, A. G. and NOSEK, B. (2001). Health of the implicit association test at age 3. *Zeitschrift Fure Experimentelle Psychologie*. 48(2), 85-93.

HENDRICK, C. and HENDRICK, S. (1986). A theory and method of love. Journal of Personality & Social Psychology, 50(2), 392-402.

HERETICK, M. L. (1981). Gender-specific relationships between trust-suspicion, locus of control and psychological distress. The Journal of Psychology, 108, 267-274.

HOLMES, J. and REMPEL, J. (1989). Trust in close relationships. In Hendrick, C. (Ed). *Close relationships*. (pp. 187-220). Thousand Oaks, CA, US: Sage Publications, Inc.

IVY, L. (1995). A study in leadership: The 761st Tank Battalion and the 92nd Division in World War II. U.S. Army Command and General Staff College, Fort Leavenworth, Kansas.

JOHNSON-GEORGE, C. and SWAP, W. (1982). Measurement of specific interpersonal trust: construction and validation of a scale to assess trust in a specific other. Journal of Personality and Social Psychology, 43(6), 1306-1317.

JONES, G. and GEORGE, J. (1998). The experience and evolution of trust: Implications for cooperation and teamwork. Academy of Management Review, 23(3). 531-546.

KARPINSKI, A. and HILTON, J. (2001). Attitudes and the Implicit Association Test. Journal of Personality and Social Psychology, 81, 774-778.

KELLY, C., BOARDMAN, M., GOILLAU, P. and JEANNOT, E. (2001). Principles and Guidelines for the Development of Trust in Future ATM Systems: A Literature Review, European Organisation for the Safety of Air Navigation: 48pp.

KORSGAARD, M., BRODT, S. E. and WHITENER, E. M. (2002). Trust in the Face of Conflict: The Role of Managerial Trustworthy Behavior and Organizational Context. Journal of Applied Psychology, 87(2): 312-319.

KRAMER, R. (1999). Trust and distrust in organizations: Emerging perspectives, enduring questions. *Annual Review of Psychology*. 1999, 50, 569-598.

LARZELERE, R. E. and HUSTON, T. (1980). The dyadic trust scale: toward understanding interpersonal trust in close relationships. Journal of Marriage and Family, 42, 595-604.

LEPINE, J.A., HOLLENBECK, J. R., ILGEN, D. and HEDLUND, J. (1997). Effects of individual differences on the performance of hierarchical decision-making teams: Much more than g. Journal of Applied Psychology, 82(5), 803-811.

LEWICKI, R., MCALLISTER, D and BIES, R. (1998). Trust and Distrust: New Relationships and Realities. Academy of Management Review, 23(3): 438-445.

MCALLISTER, D. J. (1995). Affect- and cognition-based trust as foundations for interpersonal cooperation in organizations. Academy of Management Journal, 38(1), 24-59.

MCCANN, C. and PIGEAU, R. (1996). Taking command of C2. In Pigeau, R., & McCann, C. (Eds.) Towards a conceptual framework for Command and Control.

MURPHY, P. J. and FARLEY, K. M. J. (2000). Morale, Cohesion, and Confidence in Leadership: Unit Climate Dimensions for Canadian Soldiers on Operations. In McCann, C. and Pigeau, R. (eds). The Human in Command: Exploring the Modern Military Experience. Kluwer Academic/Plenum Publishers: New York.

NEUMAN, G.A. and WRIGHT, J. (1999). Team effectiveness: Beyond skills and cognitive ability. Journal of Applied Psychology, 84(3), 376-389.

NISBETT, R., and WILSON, T. (1977). Telling more than we can know: Verbal reports on mental processes. Psychological Review, 84, 231-259.

OMODEI, M. and MCLENNAN, J. (2000). Conceptualizing and measuring global interpersonal mistrust-trust. Journal of Social Psychology, 140(3), 279-294.

PASEWARK, R., FITZGERALD, B., SAWYER, R. and FOSSEY, J. (1973). Validity of Rotter's Interpersonal Trust Scale: A study of paranoid schizophrenics. Psychological Reports, 32, 982.

PODSAKOFF, P., MACKENZIE, S., MOORMAN, R. and FETTER, R. (1990). Transformational leader behaviors and their effects on followers' trust in leader, satisfaction, and organizational citizenship behaviors. Leadership Quarterly, 1(2), 107-142.

REMPEL, J., HOLMES, J. and ZANNA, M. (1985). Trust in close relationships. Journal of Personality and Social Psychology, 49(1), 95-112.

REMPEL, J. K., ROSS, M., and J. G. HOLMES. (2001). Trust and communicated attributions in close relationships. Journal of Personality and Social Psychology, 81(1), 57-64.

RENTSCH, J., MCNEESE, M., PAPE, L., BURNETT, D., MENARD, D., and ANESGART, M. (1998). *Testing the Effects of Team Processes on Team Member Schema Similarity and Team Performance: Examination of the Team Member Schema Similarity Model* (Interim Report AFRL-HE-WP-TR-1998-0070). Wright-Patterson AFB, OH: Air Force Research Lab (AFRL), Human Effectiveness Directorate.

ROTTER, J. B. (1967). A New Scale for the Measurement of Interpersonal Trust. Journal of Personality, 3(4), 651-665.

RUBIN, Z. (1970). Measurement of romantic love. Journal of Personality & Social Psychology, 16(2), 265-273.

SCHWARZ, N. (1999). Self reports: How the questions shape the answers. American Psychologist, 54(2), 93-105.

SHAMIR, B., BRAININ, E., ZAKAY E. and POPPER, M. (2000). Perceived Combat Readiness as Collective Efficacy: Individual- and Group-Level Analysis. Military Psychology, 12(2): 105-119.

SIMONS, T. and PETERSON, R. (2000). Task conflict and relationship conflict in top management teams: The pivotal role of intragroup trust. *Journal of Applied Psychology*, 85(1), 102-111.

WITTENBRINK, B., JUDD, C., and PARK, B. (1997). Evidence for racial prejudice at the implicit level and its relationship to questionnaire measures. Journal of Personality and Social Psychology, 72, 262-274.

WRIGHTSMAN, L. S. (1964). Measurement of philosophies of human nature. Psychological Reports, 14, 743-751.

Annex A

Word lists for the Implicit Association Tests

Primary Concept	Relevant IAT				
	Team Trust	Trust Attitude	Team Attitude	Team Identity	
Trust	✓	✓			trust, reliability, trustworthy, confidence, integrity, dependable, predictable, reliable
Distrust	✓	✓			sinister, suspicion, mistrust, unreliable, unpredictable, vigilant, mistrust
Identity (Other)				✓	them, others, theirs, they, their
Identity (Self)				✓	me, myself, mine, I, self
Team	✓	✓	✓	✓	coworker, section, teammate, squad, crew
Individual	✓	✓	✓	✓	sole, alone, single, solitary, one
Positive			✓		heaven, loyal, honour, diamonds, peace, freedom, lucky, honest, love, rainbow
Negative			✓		cancer, poison, pain, rotten, abuse, poverty, evil, sickness, disaster, vomit

THIS PAGE INTENTIONALLY LEFT BLANK

DOCUMENT CONTROL DATA SHEET

1a. PERFORMING AGENCY
Humansystems® Incorporated; 111 Farquhar St., 2nd floor; Guelph, ON N1H 3N4

2. SECURITY CLASSIFICATION
UNCLASSIFIED

1b. PUBLISHING AGENCY
DRDC Toronto

3. TITLE
(U) CREATING A MEASURE OF TRUST IN SMALL MILITARY TEAMS

4. AUTHORS
Barbara D. Adams; Lora E. Bruyn; Greg Chung-Yan

5. DATE OF PUBLICATION
April 21 , 2004

6. NO. OF PAGES
78

7. DESCRIPTIVE NOTES

8. SPONSORING/MONITORING/CONTRACTING/TASKING AGENCY
Sponsoring Agency:
Monitoring Agency:
Contracting Agency : DRDC Toronto
Tasking Agency:

9. ORIGINATORS DOCUMENT NO.
Contract Report CR 2004-077

10. CONTRACT GRANT AND/OR PROJECT NO.
W7711-017747/001/TOR

11. OTHER DOCUMENT NOS.

12. DOCUMENT RELEASABILITY
Unlimited distribution

13. DOCUMENT ANNOUNCEMENT
Unlimited announcement

14. ABSTRACT

(U) This report describes the creation of scales to measure trust in teams and trust in a team leader in the context of small military teams. This work is divided into four sections. The first section includes a review of existing literature on the measurement of trust in others, trust in a leader and trust in teams. From this, implications for future measures of trust in teams are outlined. The second section recounts the process of creating the trust in teams and trust in leader scales, including conceptual decisions that were made during the process of scale development. The third section describes the design and findings of a study conducted to explore the psychometric properties of the first iteration of these scales, and offers recommendations for further refinement. The fourth and final section describes a pilot study exploring the use of implicit measures of trust in teams and makes recommendations for future work.

(U) Le rapport décrit la création d'échelles visant à mesurer la confiance envers l'équipe et le chef d'équipe dans le contexte de petites équipes militaires. Le document est divisé en quatre sections. La première comprend un examen de la documentation publiée sur la mesure de la confiance envers les autres, de la confiance envers le chef et de la confiance envers l'équipe. En se fondant sur cet examen, on décrit les répercussions sur des mesures ultérieures de la confiance envers l'équipe. La deuxième section décrit le processus de création des échelles de confiance envers l'équipe et de confiance envers le chef, y compris les décisions conceptuelles prises pendant le processus d'élaboration des échelles. La troisième section expose la structure et les conclusions d'une étude effectuée en vue d'analyser les propriétés psychométriques de la première itération des échelles et présente des recommandations d'amélioration. La quatrième et dernière section décrit une étude pilote analysant l'utilisation de mesures implicites de la confiance envers l'équipe et l'on y formule des recommandations de travaux futurs.

15. KEYWORDS, DESCRIPTORS or IDENTIFIERS

(U) trust; team; leader; military; literature review; scale development